

**Archeoastronomy,ethnoastronomy and
Archeogeodesy
Dr Suvarna Nalapat**

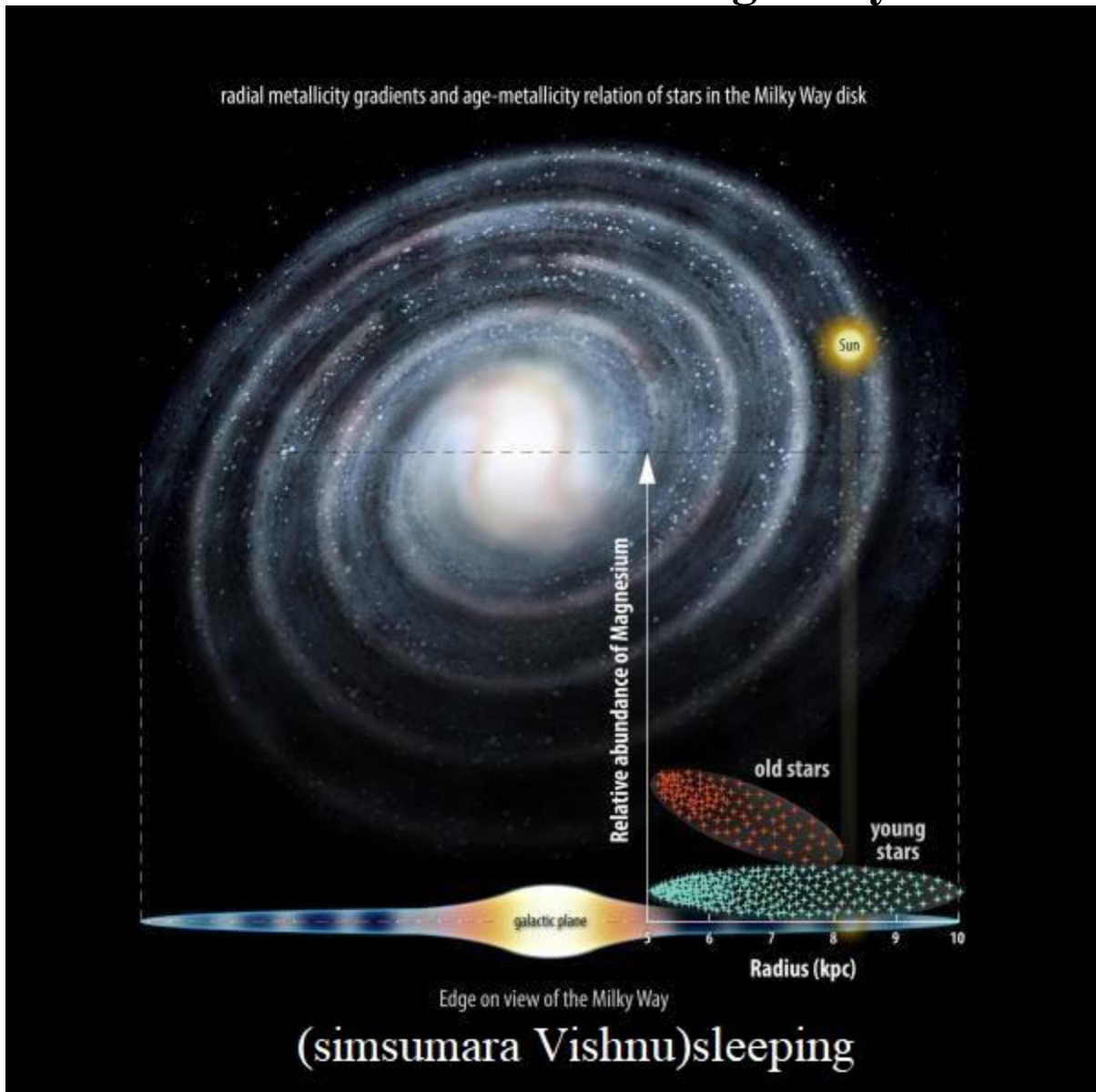


The study of ancient ,traditional astronomy in the cultural context utilizing archeological and anthropological evidence is called archeoastronomy. The anthropological study of astronomical processes /practices in society is ethnoastronomy , which is a separate

discipline as a part of archeoastronomy. That areas of study which encompass the prehistoric places, ancient sites, determinants like navigation on sea, point positioning, measure and representation of the earth, geodynamic phenomena and applied astronomy is called Archeogeodesics (Ref Archeogeodesy, The key to prehistory .1992 - 2006 James Q Jacobs <http://jqjacobs.net/astro/asgeo.html>). To discuss these disciplines one has to know the world history, the culture of ethnic population, their cosmology, and history of mathematics, their travels and skywatching, architectural peculiarities, spiritual and ceremonial traditions and the language of communication of that particular people. In this book I have been discussing the Indian perspectives of disciplines on these lines. Till 1980 the archeoastronomical research in Britain was concerned with establishing the existence of astronomical alignments in the prehistoric megalithic sites by statistical means rather than social practices of astronomy in ancient times. In the Americas

the Maya sites at Uxmal is built in accordance with astronomical alliances. Prehistory of Europe lack such ethnographic and historic records and hence this preoccupation with establishing its existence first. In 1981 Oxford meeting determined the methodologies, research questions, and so different proceedings were published in 2 volumes. Every 4 to 5 years meetings are held at locations around the world, an interdisciplinary approach combining contextuality and archeological research is approved. Rather than just establishing the existence of ancient astronomies, archaeoastronomy seeks to explain why people

should have an interest in the night sky.



- Major topics of archeoastronomical research

1.The use of calendars

How the Aztecs used the stone of sun in El Paso ,Texas?How Mexiccans thought about time?How the Indians thought about time? How they made a agricultural and a travel calendar based on Monsoon winds?How in India the astronomical observations in combination with ecological signs like bird migration were used to determine seasons and to fix date for sea voyage?How another nonagricultural calendar (like that of Mayan Tzolken)of 260 days is based on an earlier calendar in MesoAmerica as ritual cycles? Both the Arabs and Greeks have a lunar starting with the new moon.How the Greeks lack a universal calendar while the most ancient civilizations have one?How in Greece the astronomical symbolism is just a politically neutral form of timekeeping, while in America and in India it is not a neutral timekeeping alone but is linked to everyday life and practices of human beings .

2.Myth and cosmology

The sky is studied by ancient people because they wanted to explain the universe just as our scientists do. But when it comes to common people it becomes mythical.

Indians arranged their empire demonstrating knowledge of cosmology. The capital is at center. Straight roads radiate from it as sunrays and connect center to various directions ,mainly 8-10 (when up and down also included) The same concept is there in townplanning of Incas at Cusco around Andes. The division of earth of Indians take Lanka as center and similar 4 directions as straight lines and this is a quaterly in relation to night sky where Lanka correspond to first star Aswathy ,and in day with the first ray of sun on a samarathra day. The night sky bisecting the sky in one season will do the same in an opposite direction in a season 6 months later and this was the reason for this 4 directional chithrakoota (ancient stone symbol in

snakeshrine like a cross) pattern .In India actually there are 4,6,8 directions and 10 and 12 (the number of raaasi is 12) and each has fixed stars associated with the cosmic directions. The entire pattern is like the raasi of cosmos revolving around the sun,the emperor ,and around the king the representative of the sun on earth.Almost a similar pattern with 5 directions(N,W,E,S and center where emperor is seated)makes the pattern of forbidden city of Beijing in China.For Chinese the vaasthu faces south (Feng shui)but in India it faces either east or south.In a chouki (a traditional naalukettu in Kerala) there are four corridors facing the four directions and this style is a Naagara and swasthika style cosmic order of vasthu division.

The astronomical clock of Incas has common features with Indian calendar. Intihuatana (sun is tied up)has common origin in the story of Ravana ,the king of Lanka.The sun is tied at Machupichu by

their king, and in Lanka by king Ravana. It is a symbol of hidden power over the cosmos and its knowledge. Ravana tied all planets along with sun and only Saturn could free his feet just to extend it to the 12th sign during birth of Indrajith, the story goes. The catalogues and calculation tables of stars, constellations and graham (planets), division of globe and the rites of observation of the constellations of Sirius, Mizar and his binary wife and the southern cross Trisanku and Agastya had been there from very early periods in India so that they are explained not only in astronomical texts but also in Vedas and Upanishads, and the entire night sky as simsumaara, the form of Vishnu is given in veda.

When such studies are going on in other parts of the world to find out their heritage, in India there is no academic organizations or research teams of scholars who believe that the megaliths and astronomical texts are scientific and may have archeoastronomical,

archeogeodesic or ethnoastronomical values and they might even help to read the Indus script .(like ISAAC or international society for archeoastronomy and astronomy in culture, and to promote such research in India)Archeogeodesy is a key to prehistory. It combines fundamental astronomy, geodectic knowledge,applied mathematics, accurate positional data,and archeology presents a methodology for investigating architecture(vaasthu)placements,spacial properties ,relationships ,arrangements of prehistoric sites and monuments.It also presents unique avenues of assessing ancient understanding of geography ,of place and of the earth and the cosmos as evidenced by archeological remains.The temporally ,spacially ,culturally diverse ancient monuments are related(not unrelated). Ancient mounds,ancient circular stone arrangements,or megalithic stone sites and circles are thus not separate entities on the

face of earth but interrelated phenomena. Questions should be ,

- 1.Are they from the same source?
- 2.From several cultural traditions?
- 3.Which monuments have shared traditions?
- 4.When did the earliest monument appear and where and why? These questions are answered by archeogeodesy which includes cartography ,geodetic,science and mathematics.Knowing where you are located or positioned and finding the way to a new site is the fundamental task of human survival.Thus navigators and cartographers and surveyors are specialists who determine the survival of a race.It is here the seatravels of Indian navigators and their knowledge of geodesics and mathematics become important . The practicality of seatravel in India connects all their knowledge to

their life whereas in other sites without the monsoon winds and the history of navigational and searoute trade this is not there. Thus the first place to develop astronomy and mathematics and surveying earth and heavens and traveling around the globe using ways of migratory birds, winds (monsoon) and ways of the whales as suggested by the Rgveda goes to Indians. To methodically chart and explore earth we have to know the form and size of the geoid.

Advanced geodetic capacities include determination of coordinates on land or at sea with point positions resolved by measurements linking terrestrial to celestial references in a triangular net. Knowledge of solar system and its special properties and the celestial dynamics are fundamental to the practice of geodesy. In history of early geodesy, India, Mesopotamia, Egypt, and Americas and later China also were able

to understand the accurate astronomy and the spherical shape of earth. When it comes to purposeful geodetic arrangements of prehistoric monuments the Kethumala (modern Guatemala) and Lanka, Thula in Mexico and Mesha in Lanka, Atlantha (Modern Atlantic ocean) are mentioned in Indian astronomy as early as vedic/puranic/ astronomical times. This relationship with ancient constructs expressed in texts of India has to come under study of geodesy, probably the earliest evidence of archeogeodesy is these textual references. Though Rgveda and Yajurveda had knowledge of earth and its measurements as a globe encircling the sun and with magnetoelectrical potentials at the poles, historians give the credit to Pythagorus. Aristotle who discussed the spherical nature and its proof, angle of celestial pole changing relation to latitude, shape of earths

shadow during lunar eclipse(3rd century BC) owed his knowledge to India where he send his disciple Alexander in search of scholars and their books. The determination of the degree of Meridian and north south axis is a fundamental achievement in geodesy which Indians achieved from the time of Dhruva ,son of Uthaanapaada ,the firstborn of Manu.(The word meaning of Uthaanapaada is one who has raised his foot to ascend and of Dhruva is one who is fixed as polestar in heaven.)It is this which permits extrapolation of magnitude of the earth.

Two known methods of measuring the scale of the earth are

- 1.Measuring distant horizon from a high mountaintop
- 2.The angular measure of solar illumination at two points on a meridian and linear measure between these two points. Comparison of angles and

distances produce the three surface parts of the triangle with apex at geodetic center of earth ,from which a length of a mean local geodetic radius can be derived.

The earliest surveys of the earth in western world is the measure of size of earth by Eratosthenes of Greece (276 BC -194 BC) which is comparatively a late period when we compare with Indian astronomy and history of Indian seavoyages.He measured the noon shadow of sun at Alexandria on summer solstice and constructed a world map based on parallels and meridians and worked out a calendar with leapyear and star catalogue and stretched the route of Nile to Khartoum.This happened after he was working in the library of Alexandria which contained several Indian texts of astronomy brought by Alexander and Ptolemy from India.This clearly shows the origin of astronomical knowledge of Greece from Indian sources.

At present we use Greenwich meridian to determine magnitude of earth. This practice is a standardized true reference by demarcation of beginning of the day .If there is indication of a meridian in any world culture it indicates there are activities and evidence of geodesy in that particular culture. Before Greenwich, the only place where a primary meridian was mentioned right from prehistoric times with a opposite meridian as well as the primary one is India. Lanka is the primary meridian in the equatorial plane and on opposite side is the Athlanta and the Chethumala and Thula in Mexico where the Asura (Azorus) islands are located. In preislamic world apart from Lanka , the three reference meridians used were Ujjain in tropic of Cancer, and Egypt and Alexandria .(from time of Alexander and Guptha/Mourya empire). In Islamic times it became Baghdad, Damascus, and Cairo. In British east India company times Greenwich was included and it became the

only standard . Aryabhata uses Lanka for demarcation of day as International dateline. Varahamihira uses both Ujjain and Lanka and compares the ancient sites of America, Atlanthis etc .

The interrelation of megalithic architecture and astronomic geometry is well studied in places where there had been astronomy only recently, but not in India where both exists from antiquity. The tool of the navigator and the surveyor is used by the builders of architecture and this usage is in opposite direction as vaasthupurusha and kaalapurusha are in opposite directions. Spherical trigonometry was known to astronomers and builders of India.

Is the special relationship across vast distances intentional or coincidence? Are they to be dismissed as preposterous and mere coincidence? Or further examine the areas to fill in our gaps of knowledge of history of human race?

What levels of geodetic knowledge did prehistoric ancestors and cultures possess? To what extent does evidence of ancient astronomy indicate practice of geodesy? With the archeological evidence of wide seavoyages and dissemination of Indian valuables in various distant sites, and evidence of seavoyage by Indians (Harappan/ IVC) and the need of geodesic practices for such travels, and the lack of knowledge of sea travel by other cultures of the world, the study of the disciplines mentioned above are a must for understanding India's role and knowledge in such matters. Geodesic line being a shortest distance between two points on a curved surface of longitude /latitude set (this shortest distance is called a Karna in Sanskrit) or two coordinates. It is a locally length minimizing curve. A path that a particle which is not accelerating will follow. On a plane surface it is a straight line. On a sphere it is great circles like the equator. When Indians take Lanka as the

closest landmass to the equator as standard ,it is evident that they knew this,and they also knew the shortest distance taken by the monsoon winds to traverse the sea and reach the other side of globe .It is interesting that the Indian naval captain was called karnadhaara in Sanskrit language since he knew the shortest route all over the world via the sea and the curved nature of the globe and its geodesics.

Geodesics in space depend on Reimannian metric and affect notion of distance and acceleration.It preserves the direction on a surface.The normal vector to any point of a geodesic arc lies along normal to a surface at that point.An infinite number of closed geodesics exist on a sphere.Even on a distorted sphere there are at least 1-3 closed geodesics.For a surface given parametrically the geodesic is found by measuring the arc length(The chaapa dairghya).In mathematics geodesics is a generalization of notion of straight line to curved spaces.Definition

depends on type of the curved space. If space carries a neutral metric, then geodesics are defined to be (locally) the shortest path between points on space. And geodesy is the science of measuring the size and shape of earth, a segment of a great circle. The equation for length of the curve gives the distance. Then minimize length using standard technique of calculus and differential equations. Equivalently a different quantity may be defined, minimizing the energy of the curve which leads to same equation for the geodesic. Both Riemannian geometry and metric geometry contain study of geodesics. In Physics the motion of point particle is described by geodesics. In particular the path taken by a falling rock, an orbiting satellite, the shape of planetary orbit are described by geodesics in Theory of relativity. Sub Riemannian geometry describe paths that objects take when they are not free and their movement is constrained in various ways. The most

familiar example is the straight line in Euclidean geometry .On a sphere the geodesics are great circles.If A and B are centripodal points (North and South pole) infinitely many shortest paths between them exists.In Euler-Langrange differential equations (ref 3)to find the minimizing arc length,,if we use the energy fundamental as action,the equation is that of motion (Gathi) for this action and this gathi is used as gamaka in music also .From a mechanical point of view geodesic is a trajectory of freeparticle in a manifold ,in Reimannian curvature.It has a uniqueness(an individuality) as well as an existence (Asthithwa) which is a variant of Frobenius theorem.Geodesics exists and are unique.. The theorem follows from differential equations in which Indian astronomers were experts (See kuttakam of Indian astronomers). A vector field of a family of geodesic sprays on tangent bundles exists.

Sidereal astronomy of India based on stars .Vernal equinox is the first point in Aries (Mesha) as Aswathy asterism and it corresponds on earths surface to Lanka.It can vary from 0 degree Aries to 23 degree + or minus.Dhanishta was an earlier star on which the calculations were based .In sathapatha ,karthika(pleides)is described as never changing from eastern path and according to Frawly this happened in 3000 to 2900 BC .

Krithikaaswa Agnee adhaatheetha
Ethaaha vai praachye diso na chyavanthe
 (saayanabhashya).There are 5 directions mentioned here .Consider India as the center. On North is Dhruva (polestar)and saptharshi .Agni is below Krithika on east. On west is Visakha and on south Makha, Agastya and Thrisanku or southern cross and the boatshaped Argo Navis ,the ship of the southern hemisphere.,Makha and Dhruva are fixed upside down.(as coordinates). Earths axis 23 degree + or minus Aries zero

degree or Lanka is in Krithika, and Uthara bhadrapada. The opposite is 23 degree + or minus of Thula in Mexico, Uthra and Visakha. In this way all stars are in opposite pairs moving fixedly as coordinates forming a fixed mandala. Stars as coordinate fixed points and planets as moving points in relation to sun and the observer on earth and moon is visualized by the ancient astronomers. The relation of movement to rains, draughts, seasons, tides, tsunamis, birth of a (divine/royal/or ordinary) baby, etc were studied.

The stars. Sunaka, Agastya, Dhruva, Brihaspathy (Guru) Sukra, Budha, Sani, Vasishtha and Arundhathy, Saptharshi, 28 star clusters and Kapila were all known to them. In Veda vernal equinox was in Orion (4500 BC) nebula. Fire altars were discovered in ancient cities (of 3000 BC) in India, so that veda was known to Indians before that period and hence the vedic star clusters as well. In sathapathabrahmana Yagnavalkya

describes the paths of moon and sun ,and 95 year cycles to synchronise with their cycles of movements.Vedangajyothisha of Laghadha was after Paithamahasidhantha, Vasishtasidhantha,and Sathapathabrahmana and the Vedas and hence is comparatively newer to the old sidhanthaas mentioned in Panchasidhanthika..For the gathy of sun and moon one has to use geometry and trigonometry and the antiquity of it is thus very far off in time .

Sexagiesmal place value systems signify task of recording very large numbers and very small numbers .This is needed both for calculation of kalpaganitha in which universe is very old in millions and millions of years and the sun is only a small speck in its corner (In the Dhanu Raasi in India)and cyclical kalpa and yuga of very large numbers repeat ,and also for a paramaanu system of quantum dynamics as described in Kanaadavaishika .

In this context I would like to mention the first psychoanalyst in India Dr Berkeley Hills, married to a Hindu woman who had misrepresented many systems of knowledge of India .He thought the way of calculating yuga and kalpa by Hindus as the propensity to juggle with large arithmetical quantitation , an expression of moulding capacities characteristics of early anal activation, and not as a high cognitive scientific achievement as the most modern psychologists and astronomers do.He justified the British rule of India on the following grounds,based on Freudean lines.

Indians	British
Anal erotic personality structure Irritability,bad temper Unhappy ,hypochondriac Miserly,mean,petty Slowminded,tendency to bore	Have positive character. Organizational power Competence Reliability Thoroughness Generosity

<p>Tyrrannic,dictating Obstinate,no psychological disposition for leadership. Therefore all the world despise the Hindoos. Obsessive compulsive personality Infantile personality.Are like children.</p> <p>Muslims are virile psychopaths ,and political threat to the British rule.</p>	<p>Individualism General ability to lead with concrete objects of the material world</p> <p>With all these characters the British rule in India is justified.</p>
---	---

The psychoanalysis of British Indian patients in colonial India classified them as lunatics ,and mentally disturbed depending

on their access to privileges and regional assignments. The people had their own psychology and psychiatric practices and “the noisy section of the people lead by M.K. Gandhi prefers ayurvedic and indigenous systems to our modern methods of treatment” as he wrote. The noisy section of people lead by Gandhi was the Indian national congress, and their demand for indigenous systems was not appreciated, just like the other knowledge systems. Berkeley Hills even wrote that Yoga is to remove flatus which is connected with sexual impulses and a method of sublimating the sexual impulses of people. From what type of patients he collected the information is not known. But the number of his patients were not many and many of them were his wife’s relatives and friends. Anyway, the interpretation of Indian systems of knowledge by a modern medicine practicing psychologist was not correct. It was Girinrasekhar Bose (1887-1953) who

founded the Indian psychoanalytical society who questioned the above patterns of Freud's theory, the Oedipus complex and its resolution as interpreted by Freud. He argued with Freud that the gender identities in Indian and European patients is different. Yoga and the Samadhi visions and the psychological questions related to it were analysed by Bose. Which sense organs go to sleep? Which keep awake? How do dreams arise? Which part of body feel pleasure and pain? What is the source of vital energy for body? These questions are asked in Upanishads and answers sought. Elaboration of time as a dimension that embrace all experience, the central category, not of the physical, but of the inner mental world. It is not through any intermediary of special sense organs but directly through the inner mental world that we comprehend time as yuga and kalpa. Experience of time is a wider experience which include all other experiences. And social attention was given

in India to sexology even 2000 years back by vatsyayana (kamasoothra) better than any of the most modern advanced sexologist, Bose observed. So that the Indian mind is far beyond the European mind in comprehending such subjects. The way of using dream as a healing experience in temples (Bose quoted example in Tharakeswararakshethra of Bengal) was not a new thing in India. Freud's dream analysis was only a modern partial variant of that practice.

This is interesting because Freud who in the initial stages of his career identified himself with generals and conquistadors was later on in old age identifying himself as colonizers and founders of culture. He was influenced by Bose, the idol of Vishnu on his desk which Bose had presented to him and by Bhagavad Gita (ref 5). He was influenced by Indian thought in old age. But Jung was influenced by it early in his career and his mandala theories and archetypes are from

Indian thought and the concept of time and dream visions of yoga and Samadhi experiences are also more oriental than Freud's theories.

Psychologically cognition and memory ,use of language and its analysis (vyakarana /grammer) were all very popular in India right from ancient times and without proper language teaching ,teaching of astronomy and other scientific subjects and arts is not possible. Hence,for a human being to develop his faculties of analysis mathematics, spacetime sense and astronomy, musical consciousness,literary and linguistical analysis of words and their meanings are essential as well as the history of arts,sciences,and practices of his/her ancestors .This system of education was followed in India from antiquity.The ethnic peculiarities of the Indian culture depend upon a wholistic understanding of all these . When the European mind started to analyse the ancient Indian mind there had been

several pitfalls which were not probably intentional but accidental because of lack of awareness which may be equivalent to ignorance. But in the modern world, the European mind has developed so well that it is analyzing and finding out the truths which the ancient mind had analysed and discovered well in advance. But unfortunately, due to the lack of awareness of our own old texts/languages/educational practices etc we have lost sight of the significance of this change and remain in the dark. Hence any number of attempts to bring out the old glory of our analytical/educative system will not be out of place in modern Indian context. This book attempts to deal with such a wholistic approach. A comparison of what was happening in the ancient world and what is happening today is essential for such an approach.

- **Astronomy and calendar in other parts of the world**

T.S.Eliot wrote

Time present and time past
 Are both present in time future.
 And time future contained in time past.
 It may look like a complete paradox but this
 is what we call timelessness of
 Thrikaalagnaana. Time has no physical
 basis. We cannot touch it, but we have a
 sense that we see it or feel it. Even the most
 primitive human being without the
 knowledge of a clock (technology) could
 have felt it and its effect, the seasons, climate
 ,winds in regular periodic succession, day
 and night etc. The world's clocks were set
 relative to GMT only in 1884 and competing
 empires were offering alternatives, because
 the control of time meant a way of wielding
 power to them. And Britain won. Till that

time it was Lanka which was the center of the globe and since 200 and odd years this position was lost to Lanka and gained by Britain. In 1582 only the Gregorian calendar of Roman catholic church became universally accepted. And creation in Bible is only 6000 years back, and their calendar and history also was based on this timespan which is being questioned by science. But we must also realize that whatever science has proven has not percolated to masses in USA since a recent news poll showed 44 % of adults citizens of US still believe in the Biblical time of creation.

The everchanging calendar and its significance was noted in India at least from 6-to 5th millennium BC onwards. I use the word at least because the archeological evidences are only upto that at present. But as the discussions progress in this book, we will understand that to have that recorded evidence of knowledge in 6th millennium

BC the human race must have had the knowledge even before that..First calculations were done on fingers and then with cowrie shells and later on bones with enigmatic notches for timekeeping.The concepts for a calendar is the cyclical phases of moon and the sun in relation to earth watched as day,night,month and year, seasons etc.The day begin either in the evening with sighting of the crescent new moon (chandrasidhantha)or with sunrise or /midnight .The moons calendar has 29.5 days regularly and 12 lunar months of 29.5 to 30 days

The Romans used a variation of the Babylonian calendar of 10 months.in 753 BC The year for them began on March 1 Aprilis for raising of their pigs.Maius was the provincial Italian Goddess and Junius for the queen of Gods ,and here we notice a very important difference in Indian way of naming the months/rasi .Here it is based on

the shape of constellations observable by Dhikkarma that we name the months ,not on Gods or Goddesses.But,we do meditation on Vishnu as Simsumaara right from Vedic times as the sky containing all the stars , constellations ,nebulae and planetary structures. God is the allpervading spacetime continuum for vedic Indian and IVC people which shows a very scientific interpretation of universe around them.Romans added months indiscriminately to their calendar just to fulfil the whims and fancy of the rulers and astrologers of their times and this unscientific way of additions made a lot of confusion in their calendar.In 190BC Roman calendar became 117 days off and between 140-70 BC 90 days were the difference. Pontifics were entrusted to correct calendar and they were adding and subtracting days to calendar for this ,and in 46 BC ,called the year of confusion,Julius Caesar added two temporary months ,and made upto 365 days renamed the first month of the year as

Martius , the God of war,after consulting astrologers.Then ,the public thought that, their lives were extended by 90 days by this new calendar,and that was the knowledge of astronomy of Romans,both emperors and public of the period.(And to assume that the Romakasidhantha was the Roman astronomy just by the name Roma in it is thus incorrect,and the comparison of it to lunisolar yuga of Indians is worth mentioning here)In 45 BC the lunisolar calendar was put back in phase with seasons by the innovations of Julius Caesar.Julius Caesar argued that by adding an extra day every 4 years(leap year)they can convert for the missing 6 hours or so.And we still follow that.But in India following the Paithamaha panchavarsheeya yuga this addition was not needed since the year length is adjusted for the loss and it automatically correct itself.

After death of Caesar pontifics added extra day every 3 years which had to be again

corrected by Augustus Caesar after 8 AD back on track. Till that time no leap year was altered to be added for correction of the pontifics mistakes. Just as July is given Caesars name, 6th month was renamed in Augustus caesars honour.

It is interesting to note that Emperor Tiberius tried to rename September and October in his and his mothers name (prevented by senate) and Commodus wanted to add his name to all months, and changed December to Amazonians in honour of the Amazon warriors, and Nero changed April to Neronius and fortunately none of these names survived the emperors. Even in 18th century the French revolutionaries renamed all the roman names of months and replaced by descriptions of typical climate of each month. (like the hot month as Thermuder). But the changes after Augustus were shortlived. In India such changes will not be seen. Right from the south to north and east

to west this relatively big subcontinent has the lunar and solar names of the months/raasis almost uniform except for minor pronunciation changes due to difference in languages, but it had always been a unified and universally accepted calendar and this fact itself shows how the entire subcontinent was a unified whole and how it had a sound system of knowledge and educative process which had percolated even to the common masses including the housewives who were concerned with pregnancy, childbirth, and knowing correctly the horoscope of the child and to calculate muhurtha of birth etc. and to farmers who plan their crops with the geographic calendar of the area.

Whereas Indian calendar was so scientific, even in the Julian scheme of Romans there had been confusions and every 130 year they found a gain of extraday. Till mid 16th century 12 days gain was there in their calendar. This shift had

serious implications for the Christian church .Their problem was related to which day the easter should be celebrated?According to jewish lunarbased calendar ,the Gospel had fixed easter.When this would occur in Julian calendar was their serious debate.In CE 325 in Nicca of Turkey all the Christian leaders and scholars met and decided to combine lunar and solar calendar.And decided that easter should be celebrated on the first Sunday after the first fullmoon following the vernal equinox.Needless to say that this was after the Christian church came in contact with kerala and its strong astronomical calendar system.Again in mid16th century a meeting in Trent in Switzerland was convened authorizing pope Gregory X111 to investigate into calendar reformations.(This again was after Portuguese noted the Indian calendar systems)Just as Caesar ,the pope consulted several astronomers of repute and in 1582 proposed removing 10 days from October of that year.Thus he set the vernal

equinox to March 21 and continued leap year as before except at end of each century only one in four have an extra day added. In 1600 it was leap year but 1700, 1800, 1900 lost Feb 29th (which they had under Julian calendar). The revised scheme gathers $\frac{1}{2}$ minute over a year. In 2880 years one day to be added to real time.

In Belgium corrections introduced on December 21st 1582 so that the next day was 1st January 1583. And because of this foolish reformation the whole people lost or missed a Christmas, which was a comical situation.

To make things worse Catholics and Protestants adopted different calendars.

Europe had a lot of confusion over calendar reforms because they didn't know the correct principles of astronomy and were changing without dikkarma either just by hearsay or by imitation. The Gregorian calendar began on January 1. In Great Britain the national Julian calendar started on March 25th. So a traveler from continental Europe to

Britain between January 1 and March 24 would on paper have gone back in time by one year. Britain and her colonies adopted a uniform calendar only on September 1752 and by this time 11 rather than 10 days had to be removed from their calendar. It is to be mentioned that William Hogarth's print called *An election entertainment* had a learner demanding "give us back our 11 days". The time riots in Bristol caused death of several people. It also had financial tax implications to be solved. The British tax year was on 6th April and continues to do so. The traditional date March 25th (bankers refused to pay taxes and they did that only 11 days after). Sweden switched on to Gregorian system in 1753 and Greece only in 1924. The eastern orthodox church continues with a variation of Julian calendar still as well as the Ethiopians. Islamic countries still follow the lunar scheme or *chandrasidhantha* of the Babylonians and Indians. Turkey took Gregorian system in

1926 and China in 1949.(Ref 6 Bones,rocks and stars.The science of when things happened. Chris Tarney British geologist of uty of wollogong Australia .Macmillan 2006)

Indian calendar for all celebrations and functions still follow the most ancient Kalpa and kaliyuga,and the calculations of the 5 sidhanthas and only for the state functions to have uniformity we follow the Christian calendar from August 15th 1946 onwards .As I have pointed out in several places the observation of sunaka star or dogstar was crucial for vedic and upanishadic people of India for agriculture and for rains/monsoons when they decide their overseas trade movements.Bakadalbia in Chandogya Upanishad actually mentions it as a binary star. (which is now known to modern astronomers)This star was crucial for Mali tribes of Thumbuktu also and it has been found that it was known in Egypt also.In

Egypt Sirius was called Sopdet and in Mali /Thumbukthu as Po Tolo(yavadhanya in Sanskrit).Sirius is the brightest light visible in the night sky viewed from earth.It rise on horizon just before sunrise and in Egypt it coincide with Nile floods and marking of the beginning of the Calendar year.In 3000BC goddess sopdet is depicted as seated cow with a planet between her horns the symbol in hieroglyphics for the year.In a 365 day administrative calendar the rising of sopdet coincide only once in 1460 days with the administrative calendar and this is called the Sothic cycle.People had to do constant observations(dhrikkarma)to correct the year by observation just as in India.In AD 139 there was a coincidence.So by calculating backwards

1321-1317 BC

2781-2777 BC

4241-4237 BC

5701-5697 BC

7161-7157 BC

Should have been the periods of coincidence. (by anumaana) This observation was made in the Memphis or Thebes in the middle part of Nile. (depending on the latitudes of measurement the dates will be different) In 238 CE when Ptolemaic system of Greek was introduced to Egypt, Egyptians still preferred the old system because they knew that it does not track the season as theirs did perfectly well for agricultural purposes of the locality. This is true for Indians also as regard to the Christian calendar, though we use it for administrative holidays, we still use the old calendar for agriculture, for climatic predictions etc. It is a wellknown fact that 31 dynasties had ruled Egypt and it lasted till the tragic suicidal end of Cleopatra VII and the murder of her sons by Romans in BC 30 and Romans annexed Egypt and destroyed its ancient culture and knowledge systems. The dynasties of Mooshakavansa show that at

the period corresponding to Cleopatra , Mahodaya was the king of Kerala and this chronology is given by Indian ancient literature from BC 8000-to AD 6th century and the lineage exists still in India though they are no more rulers of the country. (10000 yrs chronology available).

The orbital position of equinoxes and all the seasons relative to the sunshifts is called precision of equinox and the circle of precision is 26000 years as already pointed out. This period is for the change in orientation of the earth to a distant star. The wobble in earth's rotation cause the precision of equinox. This has to be known to calculate kalpa and yuga and the concept of age of universe as several kalpaas by Indians show that they had a very scientific view regarding origin of universe quite unlike the Biblical unscientific view which had to be questioned by modern astronomy and science .Just like the sunaka star another

cluster of stars observed by Indians is the saptarshi. The great bear or big dipper and little bear or little dipper were observed by Indians. In Egypt the little bear is called Kochab and Mizar (vasishta) in the groin of great bear has to come in line with Kochab to make an epoch. In 2479 Khufu came to throne and in 2478 BC the great pyramid of Khufu was begun. This has a north-south line of observers eyes to Kochab and Mizar exactly in line showing that when the pyramid was made (2478-79) these were in a line. A consensus date of 2554 is accepted by scientists with a difference of 75 years. Snofru ascended throne in 2600 BC and his pyramid in 2526 also has an identical line with a 74 years difference. Mizar over Kochab stays in night sky for 6 months and the other 6 months Kochab lies over Mizar. The same shift in arc minutes from north still happens but it could be in other geographical directions. One important point noticed is that all the pyramids are in a

straight line and that Egyptians used stars in the little and great bear to align their pyramids and this memory is more accurate than many of us can remember events in our own life .But unfortunately Egyptian culture is a dead culture now,and fortunately Indian culture still a live one.Hence Indian culture is the only living heritage of the entire human race.And how the entire human race should safeguard and protect is something we should debate upon.

In 1628 the Xia dynasty in China came to an end.What happened to the dynasty and its king Jie? The Chinese chronicles attributes it to appearance of a comet and the following disasters.It writes:Heavy rains toppled buildings. Earth emitted a yellow fog.Sun dimmed.Three suns appeared in the sky. Frosts appeared in July .The five important cereals withered and famines occurred. The Babylonians had observed a comet in 12th century BC ,a comet that rivals the sun

in brightness. In Ireland the God Lug slay a dragon and Lug is a celtic word for light. In Hebrew encyclopedia comet is called a comet because it has a tail, and is called kokbade shabbit or the rodstar. In old testament Moses throw his rod to ground so that it become a serpent. The exodus of old testament is said to have occurred in 1628BC and at that time following dust, ashes, and darkness falling on Egypt, cattle being killed by hail, water poisoned and fish dying culminating in parting of the sea is described.

By looking at the tree rings it had been shown that there had been a famine in Egypt in BC 1153 which is 469 years different from 1628BC. In CE 540 Bailey observed that all trees in Europe had chilly time between 536-545. Same trend in bristlecone and foxtail pines of USA and in Irish annals the failure of bread in CE 536-539 showing that it had been a global phenomenon. In 536-539 famines occurred in China also.

Justinian plague in CE 542 in the 11th year of Justinian (538-539) is well known. At that time a comet appeared and stayed in sky for 100 days which is reported by Zacharias and Methelyne. In CE 530 Halley had visited earth followed by another comet after 8 years in 538. Gibbons history of rise and fall of Roman empire reports it in Sagittarii. The head was in east and the tail in the west across sky and visible for 40 days according to him. Between CE 536-37 the densest and most persistent dry fog occurred in Mediterranean and sun became dark. This phenomenon persisted for 18 months and each day sun shone only for 4 hours and that too only a feeble shadow. The fruits did not ripen. Wine tasted like sour grape (Michael the Syrian's report).

In 2004, Emma Regby, Mel Symmonds, Derek Ward of Cardiff university wrote about the impact of the CE 540 comet making their observation from Shoemaker Levy 9 that a comet of 300 meter across sky

can produce the effects described above. Shoemaker Levy had a hollow tube behind it like a gunbarrel and spread cometdust into atmosphere and similar phenomena occurred in earlier observations of comets as described by the ancient people. In CE 541 Roger Wendower observed a comet in Gaul, the whole sky seemed on fire. Blood dropped from clouds (bloodrain, redrain) and a dreadful mortality ensued.

• **The great floods**

The first flood described in India is during the time of Hiranyaksha when the earth was entirely under water and God in the shape of a boar (varaaha) lifted it up and placed in its original position. The second major floods during the last Manuanthra under Manu Satyavratha, king of Draavidadesa, has Matsya avathar of Vishnu and the story of Noah and his ark resembles to some extent the story of Satyavratha (but very late in

time). Then the history of floods is repeated and we find the story of Kerala underwater and Parasurama recovering it from oceanbed. The relatively recent floods and solar eclipse related to it are described in detail in Bhaagavatha and Bharatha during the Kurukshethra war and following that the loss of Dwaraka ,in ocean. The descriptions of these events are realistic from what we observe today ,by our modern scientific knowledge of the facts about natural calamities of earth. The important fact is that in these descriptive texts they do show their knowledge about the earth and sun and moon and the polar axis ,the repetitive cyclical changes brought about by these features etc which shows that the BhaagavathapuraanaMahaabharatha,Raamaayana are texts that have to be read not as religious ones alone,or as mythology,but as the narratives told by our ancestors about their lifestyles,knowledge systems, administrative structures etc and if viewed

like these they give valuable information to modern scientists who are groping for answers to several questions.

At present when I write this (in 2008 May) there had been a major earthquake in China and Myanmar is under floods. And great floods in West Bengal and on other side of the globe in Chile a major volcanic area has started to let out hot fumes. (And on June 27th, a quake of 6.7 magnitude in Andaman/ Nicobar was felt here in Chennai, Tamil Nadu and in July an earthquake in West Bengal. The monsoon rains failed this time both in Cherrapunji in Assam and in Kerala which are things of great concern because it foretells shortage of food, water and of electrical power in the country). And Badeli graama in south Gujrat in Valsad district, Valsad Taluka, about 7 Kms from the city of the same name is almost under sea, and since the floods two years back, following the tsunami and its aftereffects, it

had been slowly sinking under sea. Mamsad (the birthplace of Morarji Desai) is entirely under the sea and Kanchisika and Manihalia are slowly going down..In Rabaria, Thad and Hanuman philia only a few houses remain. The memorial raised for the holy fire of parsis 1300 years ago in udwaada is under the sea and during monsoons the waves rising 12 meters come to the place where the fire is kept for protection. From Dandi in Navsaari upto the boundaries of Gujrat in Umargaav about 75 meters of land had been taken back by the sea. This phenomenon is seen in Maharashtra ,Dahanu and Haji ali also. In January 2001 (on 26th)Bhuj in Gujrat witnessed an earthquake and the Kutch museum which lodge many of the artifacts of ancient history of India was destroyed. (established in 1877). The west coast of India especially Kerala and Gujrat had been under water for varying periods of time and were reclaimed and this history of floods and earthquakes and tsunamis had been part of

our life. Hence the descriptions of the port city of Dwaraka and its destruction in Bhagavatha is not a myth but history retold through several generations of people and we find that the sinking of the city and yadava race was predicted earlier by a forecast and an associated solar eclipse which shows the antiquity of science of astronomy and meteorological and celestial and natural events observations in India. It is from constant and cyclical experience of the same phenomena a people learn the reason, the science behind and the methods of prevention of catastrophies. Astronomy developed in India in this way and it had nothing to do with adoption from far off regions which never experienced this unique. The Baluchistan (old Kekaya of India) also witnessed the earthquakes recently and one must remember that it is an area in close proximity to Dwaraka and is a tract of old route to west as well as to Gandhara (Now Afghanistan) and these parts are in the course

of the tectonic plates which cause the environmental and climatic changes peculiar to India .The only other candidate which would have the same experiences and developed the same knowledge out of experience is probably the south and central Americas(either independently or as a teamwork with Indians as suggested in Ramayana and other epics)

The major earthquakes in Indian subcontinent from 1988-2001(Ref Astrological analysis of Indian affairs.1947-2050.Dhruva.Readworthy publications 2008)

Date	Site	Richter scale
21.8.1988	Indonepal border	6.4
20.10.1991	Utharakasi ,U.P	6.6
30.9.1993	Lathur.Marathwada	6.3
22.5.1997	Jabalpur MP	6.0
29.3.1999	Chanoli UP	6.9
26.1.2001	Bhuj Gujrat	7.7

Before 1988

- 1.15th August 1950 Assam . scale 8.7
- 2.December 22nd Tsunami in Tamil Nad
.Dhanushkodi is submerged in sea.
- 3.7-14th August 1968 Gujrat Floods
- 4.20th July 1970.Sudden floods in
Alakananda near Chanoli UP
- 5.1.Nov 1971 cyclone Orissa
- 6.25.November 1976 cyclone
Andhrapradesh and Chennai
- 7.27th September 1978 west Bengal floods
- 8.floods in Morvi
- 9.8th Nov 1982 storms in Gujrat
- 10.severe draughts in 1987 in many parts of
India

After 1988

- 1.21.8.Indonepal border earthquake
- 2.5th December 1988 west Bengal cyclones
- 3.6-11 May 1990 south East India cyclones
- 4.20.10 .1991 Utharakasi earthquake
- 5.14-15 Nov 1991 cyclonic storm Tamil
Nad coast

6.13-15 November 1992 cyclonic storms

Tamil nad coast

7.30.september 1993 Lathur earthquake

.8.6th November 1996 cyclone in

Andhrapradesh

9.Jabalpur earthquake 22.May 1997

10.24.March 1998 Tornado cyclone in

Orissa and West Bengal.

11 9th June 1998 Gujrat cyclonic storms

12.29th March 1999 chanoli earthquake

13.29th October 1999 supercyclonic waves

in Orissa

14.26th January 2001 Gujrat earthquake

15.July 2001 floods Orissa

16.26th December 2004 Tsunami in

TamilNad

(In August there was a solar eclipse in

Cancer and July 28th a lunar eclipse in

Capricorn.See what Varahamhira in Brihat

samhita says about a lunar and solar eclipse

coming one after another.)

This shows from 1950 to 2004 (a span of 54

years)there had been 26 natural calamities in

India (excluding Kerala from this list) and it is such calamities and constant observation of weather and the celestial phenomena leading to them that had developed the astronomy and astrology and related mathematics in India right from ancient times.

- **India's vulnerability to cyclones**

1. The long coastline of 7516 Km of which 5716 Km is prone to severe cyclones
2. 5-6 Cyclones originate in Bay of Bengal and Arabian sea every year
3. East coast is more vulnerable than west coast. Tamil Nadu, Andhra, Orissa, Puducherry, West Bengal on east coast and Gujarat on west coast are highly vulnerable to cyclone disasters
4. Only 8% of India's area is cyclone prone. But 32 crore people (a third of total population) live on coastal states and are prone to cyclonic hazards

5. Climate change and sea level rises significantly increase vulnerability of coastal population

6. cyclones bring torrential rains, gales, storm surges capable of causing heavy loss of lives and property.

7. They cause damage to crops, livestock, and hence livelihood, reversal of developmental gains having farreaching socioeconomic and environmental consequences

Because of this India has a early cyclone warning system(EWS) a national disaster communication infrastructure(NDICI) and cyclone disaster management information system(CDMIS) etc. If we understand the fact that the astronomic schools of Kerala and TamilNad coast were doing functions equivalent to these centers and there were scientists watching the celestial sphere, stars, comets, clouds, unusual phenomena on 4 sides of earths directions as mentioned in Brihadsamhitha, and they were corroborating their findings for safety of

people ,the current concept that our system of Jyothisha was a offshoot of religion will be discarded.It was a method which the people of India adopted for safe living in a climate of earthquakes,floods and tsunamis and the scientists were wellpaid .Just like the Government now issues a cyclone management guidelines (see The Hindu 24th April 2008)the astronomers through the royal machinery issued guidelines to the public how to behave when a calamity happens .BrihadVaarahisamhitha explains all such calamities that can befall each part of the country so that people who care to study the treatise get knowledge of how to escape a calamity.

What caused the great floods of the world? In 1787 Swiss Bernhard Kuhn suggested theory of earth and the melting of glacial ice and in 1840 Agassiz called it the great ice age.For understanding these one has to understand first the position of earths axis to

sun and how seasons are caused by these two celestial bodies(earth and sun)

1.The precision of equinoxes and wobble of earths rotation in 26000 year cycle

2.The obliquity and changes in tilt of earths axis in 41000 year cycles.

3.The eccentricity from ellipse to circle and back in 100000 year cycles.These are the three controls on earths orbit around the sun.

The astronomers of India knew this while the astronomers of the west had to wait until 16th to 17th century to this itself shows the origin of the science in India .

This was not known to any western scientist /Biblical people who thought the age of earth as only 6000 BC.In the west it is said to be Eratosthenese who noticed first the seasons and its relation to earths axis and sun and also Thales of Miletus is credited with prediction of first solar eclipse ,and I have already mentioned how this is impossible to digest because this person believed that earth is flat like a mat.For a

person who believes like that the prediction of eclipse and the knowledge of earth's axis cannot be known. It must be a heresy from someone else which he used as his own.

In northern hemisphere on June 21 the north half turn to sun and maximum heat is obtained there and now we take it as summer solstice according to Greenwich time. And on December 21st exact opposite happens and it is winter solstice. And, what about India and especially the southern parts of India very near to equator or Lanka. The maximum heat is during April /May in India which is Indians summer solstice and we call it vishuvath . If there is any doubt just go and experience the heat in Chennai or Delhi at that period. This is why the seasons and the vishuvat are relative to position on earth was described by astronomers of India over and over again. The people who say that the panchamga/calendar should be made uniform and change it according to their fancy forget that they cannot change the

earth's axis, and however they try the seasons follow the pattern it has been following ever since the earth and sun were formed. It is unscientific to change calendar by every power /every person in power/or by astronomers. Just watch and faithfully record is the correct policy.

In fact the seasons depend on the direction of the planets facing the sun rather than the distance from the sun and northern hemisphere summer occurs when earth is farthest from the sun in its orbit. In 1605 Kepler thought of perfectly circular orbits and European calendars made no adjustments for this. We find in Indian astronomy that the months have different lengths and we call it *raasipraamaanam* and it shows the elliptical orbital pattern as described in *Varahamihira*. Those that took place when the earth was closest to sun had fewer days, and those furthest have more days. In 1842 French mathematician *Adhemar* in *Revolutions of Sesa* wrote that to

understand the earth's orbital changes one has to understand ice ages. A lot of ice ages have passed by (not just one) in the past due to the shape of the earth and the precision of the equinox in 26000 year periods. Ice ages occur at different times in the two hemispheres of the earth, because they occur when the winter is at the farthest point from the sun. But this was hopelessly wrong and both hemispheres get ice age and heat throughout the year in the same pattern. But he was right in saying that there had been more than one ice age. British scientist James Croll said in 100000 years the shape of the earth's orbit changes from elliptical to circular and back and precision played a role in high eccentricity. The Paithamaha panchavarsheeya yuga takes both these shapes into account and is a correction/ autocorrective principle so that we need not alter the calendar at all.

Earth nods backwards and forwards between 21.5 to 24.5 degrees and when there is more

tilt at great angles the poles receive more heat.

With the three features described above the last iceage could not have been there for at least last 80000 years according to scientists When glacials melt sediments with minerals in lakes occur just like tree rings and they are called Varves. The comet varves with cometic dust is studied to know how many years a glacial has fed into a lake. Counting comet varves in Swedish areas Gerard de Geer says ice retreat had occurred in Scandinavia icecap in 10000 years back. In 1920 taking the combined effect of the three cycles mentioned above, Milankovitch says the last ice age finished in 10000 years back. What about the earlier ice ages? Studying the ocean floor the shells of foraminiferae in 1955, Cesare Emiliani with radioactive isotopes of oxygen, found out that a cycle of warm and cold temperature over the last 300,000 (3 lakhs) years. The temperature curve of ocean is similar to that

predicted by orbital theory of ice ages.as Melanchovich suggested.In 1960 it was found that sampling is best from tropical ocean sediments .Ocean here acts as a single enormous conveyor belt taking warm surface water to north Atlantic (gulf stream) and returning south as cold dense water at bottom.The cowries from here give a pure record of changing icevolume .In mid 1970's two ocean cores were studied from Indian ocean.Changes in the earths magnetic field and radiocarbon dated cowries in the core gave an unusually high rate of sedimentation showing their antiquity.

Results:-Changes in icevolume exactly the same as the orbital theory predicted.The cycle times of eccentricity,obliquity and precision of equinoxes were all there .This is very important for human race ,and the kalpa , yuga calculation of South Indian astronomers and their cowries and their ideas about the floods has to be considered the most authentic and the most ancient of

the human memories on natural phenomena and calamities. In Antarctica natural climatic changes spanning around 800,000 years is reconstructed. 100,000 year cycles are seen as clear as sky. In Greenland the cycle goes back undisturbed only to 1,230,000 years. Massive frequent shifts in temperature between 90,000-115,500 years called Dansgaard – Oeschger event is noticed. Mini ice ages have happened in north hemisphere about 8,200 years ago.

The Indian cycle of 432,000 years of life and destruction means by CE 2000 the age of earth is 197,294,910 years while Zoroaster thought it is 12,000 years only, and Julius Africanus as Christ coming on earth on 6th day of creation on 5,500 BC. Anglo-Saxon chamber believed recorded age of earth as 5,200 years, and in 16th century Martin Luther said only 4,000 BC. Rosalind in As You Like It of Shakespeare echoes this when she says "The poor world is 6,000 years old." According to old testament Adam had

his first son Seth when he was 130 years old, and Adam lived for 930 years. Bishop Usher of Anglo-Irish church announced in 1654: "Beginning of Time according to our chronicles, fell upon the entrance of night preceding the 23rd day of October in the year of Julian calendar 710..710 years after zero year, creation started.

In mid 1700s French Denis Diderot said it is millions of years old and Immanuel Kant said of a universe of order of millions of years. In 1788 James Hutton first thought of a timescale impossible to calculate or conceive since it is having no vestige of beginning, nor any prospect of end. (The *anaadi, anantha* concept of ancient Indians was again surfacing, this time in a western mind for the first time). In 1859 Darwin's first edition of *origin of species* suggested the south downs of South England might have taken 300 million years to reach its present position and Lord Kelvin was exasperated

with Darwin for ignoring the second law of thermodynamics.

Charles Lyell in 1867 in his principles of geology suggested last ice age between 750000-800000 years. 95 % of modern seashells are found in one million year old deposits of Indian ocean and this was the time for 1/20 revolution in a species. A complete revolution in a species occur in 20 million years, and 12 such revolutions, at the beginning of Cambium period 240 million years, means very much older than suggested by Kelvin. In 1860, time for Ganges basin was found to be 96 million years and in 1878 the age of earth was considered to be 200 million years. Edmund Halley questioned Usher from the saltiness of the ocean. In 1889-1901 John Joly of Dublin university college suggested 90-100 million years as suggested by Kelvin. Salt is normally recycled in ocean. Ernst Rutherford in 1900 used radioactivity to measure age of earth. In 1907 helium gas a

byproduct of radioactive decay with a half life of 45 billion years ,it was possible to take backus to dawn of time.1905 uranium rock samples with lead as endresult of uranium decay(uranium lead method) showed earth as 570 million years old.1931- Arthur Holmes as 1460-3000 million years old.Uranium started to decay in 4500 million years ago and that must be the maximum age of earth.It must be remembered that in Kerala coast thorium and uranium are found and the age of kerala must be the age of Uranium decay and the time of kerala history of vaamana/parsurama must go back to those times if we scientifically apply these criteria.

In 1950 iron meteorites were measured for average lead composition and upper age limit determined as 4600 million years ago.(from extraterrestrial material).The timescale is virtually infinite.

And in 2003 13.7 ± 0.2 billion years is the estimated age of universe.When we are

looking at stars in sky we are traveling back in the corridors of time. But we don't realize it. To complete 13.7 billion years to 6000 years, the speed of light has to be of very high magnitude and greater the speed of light the massive the rate of radioactive decay and fatal amount of heat on earth, which will become incinerated as a vapourizing planet and our ancestors would not have survived such a condition.

The story has many elements of history, science, and politics of science. Rudolf Virchow, father of cellular pathology said a single discovery may change the whole state of affairs of the world. This is true not only in Medicine, astronomy but also in history, archeology. How the geologists changed the history of human evolution goes to the discovery of the Java man. There is magnetic field reversal of the poles and in the past 3 million years at least 10 such reversals has happened and this paleomagnetic polarity

timescale is helpful to geochronologists as supporting evidence to their findings. When a volcanic eruption occurs from the $K40/K39$ after several thousands of years by neutron, and laser actions respectively argon 40 and argon 39 are formed ($A40/A39$) which are measured in gas mass spectrometer called argon 40/argon 39 measuring method. (pp24 Garmiss curtis, Carl Swishor, Roger Lewin. Jawa man. Little brown and co 2001 Ref 9)

There are two models of evolution at present debated.

1. single origin evolution. geographically local population of Asia and Europe replaced by recently evolved population of modern human that spread out of Africa.

2. Multiregional model. Modern human evolved from ancient geographically local population with lot of interbreeding among them.

The multiregional approach is more feasible but many modern European scientists prefer the single model of migration from Africa so that Europe can claim at least a second place (first being Africa) and Asia goes back. In the multiregional hypothesis of Gustav schwalbe and Frong weidenreich parallel enduring lineages occurred in various regions of the old world, south east Asia being one among them formost in timescale after or along with Africa. In updating weidenreich model Milford Wolpoff and Alan Thorne argued that the different geographic populations were not entirely isolated from one another and that limited genetic flow (intermingling) between people has been important. The multiregionalists argue that the evolution from homoeructes to sapiens had been a continuous transformation within genetically coherent lineage, even though geographically dispersed. No clear break occurred between homoeructus and homosapiens occurred but

only a evolutionary continuum and that all human beings from 2 million years onwards had been members of a single species homosapiens. (In Ramayana we have evidence for this because human beings with Riksha-chimpanzeelike-and apelike countenance were living together with homosapiens and even in Mahaabhaagavatha we find one of the wives of Krishna being a descendent of the Riksha race.) Out of Africa model is the younger of the two models. In 1960 Lois Leakey put forth this. The following table show the feasibility of the hypothesis under some conditions being fulfilled.

If Out of Africa model was correct	If it is not correct
1. Anatomically modern human beings appear only	1 modern and ancient simultaneously appeared and lived in the world

in one geographical area-Africa 2.Transitinal forms between archaic and early modern found only in Africa 3.No link between anatomical variants in modern and ancient populations 4.No evidence of hybridization between them	2.Homosapiens and eructes not only coexisted but had intercourse 3.Transitional forms discovered in all parts of world. 4.should be regional continuity of characteristic anatomy.
--	--

So in search for proof of it,in 1987 Allen Wilson put forth the Mitochondrial Eve hypothesis tracing ancestry of all human beings to a single female in Africa.Suppose there were 5000 couple with different family names .Each with 2 offsprings only.In each generation $1/4^{\text{th}}$ of the couple have 2 boys, $1/2$ have one boy and one girl,and $1/4$ have

two girls then the first generation children marry $\frac{1}{4}^{\text{th}}$ family names are lost from the families that have only girl children .And after 10000 generation which is equal to twice the number of original mothers only one family name remain .This pattern is seen for mitochondrial DNA hypothesis. But through female line(not through male line as described by Europeans who follow patrilinear , but as Asian and African follow, matrilinear). Therefore the One single lucky mother as suggested by them is actually not the only single mother but 5000 other colleague mothers were there and if all these conditions satisfied her mitochondrial DNA alone survives after 10000 generations which is only a probability. Wolpoff states that one human population replacing everybody else unless they resort to sheer violence is not possible. But efficiency of exploiting food resources between two populations can result in rapid extinction within a single millennia of the less efficient

of the two. And when population falls to very low numbers say a few hundred thousands, a population bottleneck reached, and then only a single man/woman (Adam/Eve image) emerge. And at such times because of biological urges the two different populations mingle and produce hybrids and a multiple origin model is thus logically more plausible.

In his book *What evolution is* (A phoenix paperback 2002) Ernst Mayr gives three alternatives.

1. A world of infinite duration
2. A constant world of short duration Biblical world created in 4004 BC, ie 6000 years back - The creationist world
3. An evolving world or anticreationist world after 17th century science of Copernicus which is of very long duration and forever changing.

In Indian astronomy and scriptures all these are seen as cycles within cycles and a 4th

cycle of very short individual world (personal world)is also seen for interpretation for astrologers,because common man is not concerned with what happened 3000 million years or 6000 years ago,but what will happen to him in near future is his/her main concern.

When kalpaganitha is a world of infinite duration of multiverses,science of astronomy gives an evolutionary world of Mahaayugas which change forever but with cyclical evolution and the shortest Kaliyuga of creationist world ,within which is the present life of the present observer on earth . Coming to Darwins 5 major theories of evolution(pp 94 ibid)and the rejection or acceptance of these postulates by others (pp 95 ibid)

- 1.Nonconsistency of species
- 2.Descend of all organisms from a common ancestor-branching evolution
- 3.gradualness of evolution-no saltation,no discontinuity

4.multiplication of species and origin of diversity

5Natural selection

Scientist	Com mon desce nd	grad ual	Populat ion speciati on	Natural selectio n
Darwin	yes	yes	yes	yes
Lamarck	no	yes	no	no
Haeckal	yes	yes	?	partly
Neolamarc hism	yes	yes	yes	no
T.H.Huxle y	yes	no	no	no
De Vries	yes	no	no	no
T.H.Morg an	yes	no	no	unimpor tant

According to Hardy-Weinberg principle (1908) about allele frequencies it remains generation after generation (if no genes lost or no genes aquired)according to the law of

binomial expansion(which is a mathematical law /not a biological law)and this happens in several ancient groups of human populations. (with inbreedings)

Example-gene A1 and A2 are alleles in a population and frequency of A1 is p and that of A2 is q.

$$P+q=1$$

SPERM			
Male			
A2(q)	A1(p)		
A1A1(p) ²	A1A2(pq)	A1(p)	
A2A2(q) ²	A1A2(pq)	A2(q)	
EGG(Female)			

$(P+q)(p+q)=p^2+2pq+q^2$ The binomial expansion is maintained generations after generation unless there is an addition or loss of genes. A tentative suggestion of hominid phylogeny till 1990 is given on the page 267 of their book .

There are 3 stages of hominisation

1. Rain forest stage
2. Tree savanna stage
3. Bush savanna stage

Australopithecus (5-8 million years ago-my) A vegetarian in east Africa

A. africanus – Ethiopia and Tanzania documented remains.

A. africanus from south Africa younger than *A. afarensis*

Australopithecus evolved 8-6 mya from chimpanzee.

Common ancestor chimpanzee 8-6 mya

Australopithecus 3.8-2.4 mya

A. afarensis	allospecies	allospecies	Africa	allospecies
--------------	-------------	-------------	--------	-------------

3.9- 2.8mya			nus 2.8- 2.3 mya	
	Robust species A aethiop icus 2.8- mya			
	A robust us 2.5-1.7 mya And A boisel 2.8-1 mya			
2 mya homoh		Homoer uctus		H.rudolf ensis 1.9 mya

abilis E Africa		1.8- 0.2mya		larger brain than homoha bilis
		Homoer gaster 1.8-0.6 myain Africa		
		3 branches for this Homoer uctus 1.8-.2 mya west Asia,Eur ope Homoer uctus descenda		

		nts .6-.2 mya other parts of world Homosa piens 0.2 mya to now		
		From homoeru ctus of west asia and Europe Heidelbe rg 0.8 mya		
		From them Neandert hal 0.5 -		

		0.027 mya		

Stone tools were detected from dwellings of rudolfensis in Jawa described first in 1892 and in china in 1927. The earliest representation from Africa is ergaster a subspecies of erectus that spread from Africa to Asia between 1.9-1.7 mya. And it is the first hominid to spread from East Africa. But the remains of fossil specimens from East Africa, Beijing, Java, Georgia (caucasia) of 1.7 mya and in east and south Africa show that it had been a very wide spread species and that it existed without any change for at least a million years in different parts of the world. Homo erectus used a simple set of tools and could tame the fire. It had a 862 cc brain while australopithecans had only 450 cc and rudolfensis had 700-900 cc. We homosapiens have 1250 cc which is nearer to rudolfensis

.The statement that the ancient hominids or neanderthals from England ,Germany, Greece migrated to Java (Ngong dong) given on page 275 of the book after this description looks funny ,if not a cookup for proving something else.And on page 276 it is said mitochondrial DNA of Neanderthal and homosapiens lineage split around 4,65000 years ago is still more funny and indigestible from what is given on page 267 .The cromagnons according to this page is homosapiens invaders of western Europe and their brain size is 1350 cc just like homosapiens and they were dominating for 100,000 years ,and homosapiens from Africa reached Australia and America only in 50000-60000 years period and East Africa 30000 years back is also funny with the statement that homosapiens brain had not changed since their appearance since 150000 years ago.
All these statements are contradictory .

Rudlfensis using simple tools of stones,
 Homoeructes using achuelian tools ,
 Neanderthals using Mousterian tools and
 Cromagnon/Homosapience using aurignac
 tools (which are also seen in Neanderthal
 fossils showing their coexistence)is to be
 taken with some possibility of overlaps
 .Here we must remember the difference
 between evolutionary biology and
 evolutionary astronomy.Evolutionary
 astronomy observe directly the universe
 around ,while biology is inferring from the
 indirect evidence from the context.
 Former is Prathyaksha and the latter is
 Anumaana according to Sanskrit way of
 expressing science.Life has a purpose or
 rather a sense of purpose.It has a reason and
 a sense of direction and change always
 implies a progress or a degression (either).In
 this pattern what is the role of a larger size
 brain,language and syntax as
 communication, and development of
 altruism as an evolutionary process from

animal nature to human and divine nature? This has been a question of debate for scientists and philosophers.

Altruism is considered as a behaviour against the interest of the individual that performs it and is in the interest of others/in a group. This increase the chances of the others prosperity, reproduction and jeopardize ones own interests. The person with altruism who toil for prosperity of others, even neglecting ones own lineage (without marrying) jeopardize ones genes by not allowing that to prosper and to persist. He causes destruction of a genetic material. (sanyasin) Yet as Hamilton had said it is the cornerstone of a humanistic outlook and for the answer to kinship rather than to wars. From the individuals point of view it is altruism but from the genetic point of view it is selfishness which benefit for the possession of the same gene. Understanding the complexity of life is understanding the resolution of conflicts as well. Wallace once

remarked about the sandaals of India that they have as pure a love of truth as the most moral among the civilized men.(pp 76 Marek Kohn –A reason for everything .natural selection and the English imagination Faber and Faber ltd 2004.Ref 11)The authors also say that the three faculties (Mathematics,sense of humour and music considered as higher faculties)are confined only a very few % of population even among civilized societies.If we look at the long record of India we find a very strong streak of music,mathematics ,sense of humour and love for truth which shows the longest innings in the entire world ,I should suggest.

India was always aware of the multiple universes and the many relative times in each of them and the many histories and minds which the modern quantum physics is looking into.There is a story that Alexander when he heard from Anaxarchus that there are infinite number of worlds cried.The

reason was , he asked Anaxarchus:-Do you not think it is a matter of lamentation that when there is such a vast multitude of them ,we have not yet conquered this one?
 (Plutarch on the tranquility of mind.Q.The quantum mechanics of minds and worlds .Jeffrey A Barrett oxford uty press 1999)

This is a relative mindset of an observer as a conqueror or a warrior.The relative mindset of a researcher or enquirer of truth will be astrophysics /astronomy and Naadabrahma /music as the dwani varna and sakthy of the prapancha and these gave rise to Musicology , Thanthra and yoga and the instruments used for various measurements resulted in yantra used in astronomy, music,medicine, yoga,thanthra and sacrifices and these are the very first instances where we find the higher intelligence of a highly systematic order and therefore the sciences of India should be studied as a world heritage. Especially the science of mathematics,

music, astronomy and the related disciplines. They will give us lot of insight into development of a civilization from the primitive people of Indian subcontinent and Southeast Asia which spread to Americas and Europe in turn. If it had been Africa from where people of India and south east Asia originated why these people did not go back there and build up the cultures there would have to be answered. All of us know that Africa remained a dark continent until the wake of the past 2 or 3 centuries and still is in many respects.

It is when you are thinking about only a landroute that you think of a single ancestor theory. North America is connected to Asia by Bering strait. Landbridge between the two continents. Around 30000 years back humans lived in North east Asia, a time of high sea level so that they could not have used the land bridge. Only 13000 years ago man crossed from North Siberia to Alaska. At that time the sealevel was low. Nobody

has thought of the seabridge in Indian ocean between Lanka and India. The bridge whether made by ancient man (Nala and Neela) at the request of Rama or a natural phenomenon is there still to cross over between these two areas when the sealevel becomes low. Whether this happened in 13000 years back when the sealevel was low, and in that case whether the story of Ramayana took place in that period is something to be investigated. It is a plausible hypothesis. The first evidence of people in North America is 11300 years ago (Clovis people) and they lived in eastern New Mexico and their fluted spearheads are found with mammoth remains. But no Clovis-like tools in Siberia and the closest resemblance tools are from Southern France (Solutrean people) of 16000-19000 years but they do not have a landbridge to cross over. In South America before the Clovis people at Quabrada Jaguag of south Peru existed and they were doing fishing

expeditions from 11100 years back. In South
 chile 12500 years ago lived huntergatherers.
 Darwin thought first man existed in Africa
 while Ernst Haeckel thought in South East
 Asia. Dr Eugene Dubois a military doctor in
 Dutch army convinced the authorities that he
 should be relieved of his medical duties to
 do research and in 1890 he studied fossils in
 Java and found out the skullcap of the
 homosapiens. Java man, Peking man etc are
 now considered to be belonging to
 Homoeructus species. The argon method
 shows homoeructus in Kenya 1.88 million
 years old and Java 1.81 million years
 old. The question now is, how the
 homoeructus of the Africa reached the other
 side of the globe ? Did the homoeructus
 sometime between 1.8 to 1.4 million years
 ago suddenly decided to pick up its tools and
 to move out of Africa to Indonesia? (pp 124-
 125 bones , rocks and stars . The science of
 when things happened. Chris Turney .
 Macmillan 2006.). The Neanderthal

dominated the high altitudes while other species dominated the tropical belt and Neanderthal evolved in a different pathway from the modern species of man. According to 2005 evidence Ethiopian homosapiens are 196000 years old species. (please see the Indian astronomy calculation of age of earth) and till 40000 years ago Neanderthal and homosapiens had no contact. (according to scientists) But in 1920 caves of Israel showed Neanderthal remains and homosapiens remains. When electron spin dating was done here the unexpected was seen. The Neanderthals skulls were only 50000-60000 years old and homosapiens were 90000-130000 years old. So the earlier view that Neanderthals lived before homosapiens became a myth. Nowhere is evidence for battles between the two, but it is possible that interbreeding between them also was only rare.

Homoeructes in Java (Sumatra, Java and Borneo together is termed Manidweepam in

Tamil ancient sangham literature)and Indonesia lived there 1.43 million years ago.The ngangong homoeructus was only 27000 years old.They survived one million years longer in Java than in Africa.They were alive at the same time as the last of the Neanderthals without battles and possibly with inbreedings .According to Ramayana the moolabala(ancient army)of Ravana came from south East Asia and Western islands (Peru/Mexico) to help him in battle.

Uthararamayana also speaks of a group of ancient people in the south east Asia who were conquered by Sitha (not by Rama).

The biogeographical boundary Wallace line in Indonesia has flora and fauna of south east Asia and the east towards its west and flora and fauna of Australia to its east.Java and Bali are to the west of the Wallace line and Flores to the east.Islands become connected to Asia during changing sea levels.Verhonens finding that the 750000 years old stone tool in Flores(to east)that

homoeructes had crossed the ocean breaching the Wallace sea and that they were able to do oceancrossing is important here. Shipwrecks of ancient people in Manidweepa is mentioned in old Tamil texts and in Ramayana the relatives of Ravana of Lanka were in these areas .(The moolabala or the base army was located there)In 1998 archeologist Mike Morwood using method of fission track(decay of uranium)found that it was 840000 years old and that Verhoven was right. But what had happened to toolmakers ?Homoeructes of Java existed from 1.43 million years to 27000 ago,a long stint of existence,they crossed the sea at Wallace line,but no skeletal remains so far from Flores.Why?The question answered on 12.september 2003.In west Florence a complete skeleton,stone tools and stegodon hunting remains at 5.9 cms depth was unearthed and it was an adult female.It lived 18000 years ago.It was a homoeructes,not stupid because it was using tools and it was

a female who could hunt /or possibly helped in hunting.Is this the race that crossed the Wallace line,the race that traveled from Africa ,stranded on an island and shrunk or a flourishing indigenous bred being /or more plausible an ancestor belonging to Indian /Indonesian races who could cross over to Lanka and do ocean crossing even before homoeructus?On 28th October 2004 it was announced to belonging to Homoflorensience or Hobbit.There are folk tales in Flores about an ancestor which ate anything and they call it Ebu Gogo.The villagers story is that they eat not only food but also the plates made of pumpkinbases .(The pumpkin was used in India also as plates,musical instruments and many other yanthraas and here also is a story of baby Ganapathy eating everything including vessels)These people existed in Flores until only a few centuries ago and therefore these folktales are not mere myths.All these suggest that 30000 years ago at least 4

species of human beings existed on our globe ,they could cross oceans and landbridges, they were using tools and they lived peacefully(peaceful coexistence)and were intermingling some of them with intermarriages and genetic transfers as Raavana story of India suggests.

The ancestors of Ravana lost their lands in a floods on the other side of the globe and one among them came to Nepal with his daughter and married her to a sage (vishravas)and Ravana was their child(a crossbreed between Indian father and foreign mother).The sage had another son who was owner of Lanka and Pushpaka vimaana and Ravana abducted both from his elder brother and became ruler of Lanka (This is an intercontinental /global marriage and gene transfer.And Ravana himself married daughter of his own clan from Athalaantha ,daughter of architect Mayaasura –Mandodari and also a girl Dhanyamaala from Asia .)The folktales and

so-called mythologies need not be tales or myths if we look at them as the oldest memories, archetypal to the human race. The geologists were struggling to reconcile with Bible history because there is no history of prehistory in Bible but the fossil evidences are so many and theory of evolution does not support Bible. But if they study Indian scriptures they would find enough of prehistory to learn and enrich their knowledge because it is a very very ancient archetypal memory of human race that is preserved in them. Geologists think 250 -251 million years ago 95 % of all species were extinct and they call it great death. A series of volcanic eruptions occurred at K.T boundary (K for Kreide or cretaceous and T for tertiary) and the best contender was the Deccan traps of India. The largest known volcanic activity occurred at that line migrating to the north over a hot spot currently sitting under reunion island in Indian ocean. Deccan is an

enormous plateau with an area about the size of France (500000 sq kms or 1 million Km³ of lava) of flood basalts and the eruptions must have gone on a long time to produce this much of lava. The ashes and gases shielding the earth from sunrays decrease photosynthesis, cooled climate with global extinction is the geologists view. Is this in the memory of the scriptures? I searched and found out it is described in Ramayana. The story of Dandaka forest which was under Dandaka, a son of Ikshwaku, was destroyed by dust and stones from a volcano and several years after, huge trees grew in that place, but it became a place not fit for inhabiting since the Thataka, Subhahu and Mareechan clan came to dwell there so that not even travelers or sages could frequent it. And sage Viswamiththa explains the story to Sreerama and Sreerama kills the clan and makes the dense forest inhabitable again. So it is there

in the archaic memory of the people of India.

In 1960-70 potassium-argon, argon-argon studies it was found the Deccan plateau lava flowed from 40-100 million years ago and the extinction took place 65 million years ago. Alvarez team from California suggested based on the Indian study a viable possibility of a meteorite impact. About 10+-km across with fires, acid rains, which can kill anything around 500 kms and which can cause pulverized rocks blocking sunrays for months together. A more recent detailed argon-argon study indicates peak activity in Deccan to be 67 million years ago, which is at least 2 million years before the KT boundary period. It is interesting that the same team studied Chicxulub, a geological feature in Yucatan, Mexico about 200 km wide. This is actually 180 KM wide and 64.98+-0.05 million year old crater and statistically indistinguishable from 65.01+-

0.08 and 65.07 \pm 0.1 million from KT boundary sites.

The relation to Deccan and Yukatan is interesting .I have mentioned about the astrological,archaic memorywise and ocean travel histories of Indians and the relationship between India and the ancient Athalanthia (Atlantis,Atlantic ocean etc still exist as remnants of Athala,Athalanthia etc mentioned in Indian scriptures and Azores islands as old Asura islands of India)of architect Mayaasura and his tribes in another chapter.In Indian astronomy and its 4320000 year cycles of life earth is 1972949101 years old and the archaic archetypal memory of Indians goes back to such periods ,which is not found anywhere else in the world .

In 1970s the woman gatherer hypothesis arrived.For humans plant foods (not meat)is the major food item Plant food and agriculture had been the focus for technological evolution and social

behaviourisms .Adrienne Ziehlman championed this hypothesis.The female and the offspring sharing food gathered by the adult was center of social life.Males were rather peripheral in this.Innovation of food production,tools to unearth underground tubers,for agriculture,irrigation,and for food processing and storage of food all center around women and family.So man the hunter model and woman the gatherer /cultivator models were suggested.Presence of female/child fossils thus show a wellknit socially centered life and culture.If we look at the Florens skeleton of the female the simple presence of a female skeleton itself is evidence of role of female in household.Homebase,foodsharing,integration of many aspects of human behaviour and social life started with females and family life and reciprocity systems,exchanges,kinship ,subsistence,division of labour , communication and language which are

important for anthropologists and sociologists alike developed from this. When did the human intelligence and creativity, reflective consciousness and use of language and communication as educational tool and preservation of archaic memory and culture start? This is the most important stage which distinguished animal from man.

The first founding father of human family stood upright 5 million years ago.

The first record of stone tool 2.5 million years ago.

Oldowan technology of *Homo habilis* 2.5 million years ago

Homo erectus also use oldowan technology
Acheulean tools 1.5 million years ago.

But language is the quintessence of the brain functions of human beings. The world of words of mundane conversation and the world of words of intellectual, spiritual, religious, mythological, scientific and

artistic thoughts ,of mathematical abstractions make the totally evolved human being.Language liberates us and to some extent constraints us too.

But when did language appear?And why did it evolve?From point of view of natural selection it developed for communication.For neurology(Harry Jerison)merely an expression of another neural contribution to construction of mental imagery.Through language ,or precisely through reflective thought and imagery mind creates internal model of the world that is uniquely capable of representing or coping with complex social ,cultural,practical challenges.Inner thought,not outer communication alone,was the faculty upon which natural selection worked .The language is only a medium for that.So it is impossible to separate evolution of language from evolution of introspective consciousness ,a human faculty distinct from other animals.

To assess social behaviour of a group ,to predict ,and to understand it one has to create a model of social interaction partly by being aware of ones own behaviour and motivation. Language and introspection ,consciousness can combine to do that. This is known as social brain hypothesis. From brain size and form, and the anatomy of larynx and voice box language must have developed gradually ,beginning early and continueing even now relatively in different groups and individuals. In all mammals larynx is high in throat. Underside of skull is flat. In man it has a low position so that a range of sounds is produced and underside of skull is formed flexed like a bridge. From homohabilis and to Neanderthal the degree of this flexing gradually increased through time ,beginning with homoeructes. This is a signal of gradual development of language abilities in man. Homoeructes had smaller holes than homosapiens in the spinal cord in thoracic region ,the enlarged holes in

homosapiens accommodate the well developed necessary nerves that control muscles of chest wall and abdomen which is important for fine orchestration of breathing and for producing complex spoken language. This being less the speech of homoeructes would not have been as good as that of homosapiens.

Artistic expression, symbolic abstractions, were unthinkable in the absence of language. Symbol making(engraved or painted image)and expressions therefrom which are having artistic value in IVC has to be thought of in this context.To develop that much of art,symbolic abstraction and communicative lipi ,the human being must have evolved a language very very early and perfected it through several stages .And Paleolithic acheulian tools from central India show that the development had occurred in gradual stages here itself and not from anyone outside.In Europe symbol

making appear in upper Paleolithic era 40000 years ago and language appeared late in prehistory. But trace the history of language in Europe and India, the living languages and traditions in both areas on a parallel basis we find Europe developed it later than India and the south east Asia and Americas are the only candidates with some chance to be contemporaries or late contemporaries of India.

Archeologist Randall White says 100000 years ago there was total absence of language. (pp 180) It was slow to develop from 65000 years back. There are 7 evidences.

1. Deliberate burial of dead with grave goods in upper Paleolithic Neanderthal men remains
2. Imagemaking and body adornment seen with upper Paleolithic (later stone age)
3. sudden increase in technological innovation and cultural change

4.Regional differences in culture as expression and product of social boundaries

5 Evidence of long distance contacts ,exotic objects ,rare stones etc being shared and traded

6.Planned cities,houses,dwellings etc increase in size ,language being a prerequisite for planning and coordination of any kind

7Technology move from stone to raw materials like bone,antlers,horns,shells and clay etc.

Accepting a multiregional model of development of human race ,we find these evidences for language, communication, planning as well as long term plans for education,and understanding of the production of sound and its various aspects ,a syntax ,and a system of observation and toolmaking for research and observation of heavens,seatravels for trade and commerce

etc and both prakrith and sanskrith languages simultaneously developed (multilingual) in Indian subcontinent as well as a continuous existence of human race here from very early prehistoric times. None of these can be ignored. In Linnaean hierarchy we do accept species, subspecies, genus, tribe, subfamily, family, order, cohort, class, phylum and kingdom. Homosapiens have all these and the tribes of India and south east Asia are a unique group which deserves to be studied in detail along with their American colleagues and relatives in Yukatan and Mexico, Kethumaala and Athlantis so that the missing link in human understanding of prehistoric and historic man would be bridged. I just remember that Iguanidae a reptile seen only in N and S America is also seen in Fiji and Tonga (western Polonesia) thousands of kilometers away separated by ocean and how did they reach there? By raft? or by ship? or developed as two separate endemic geni

there? The same is applicable to humans also. So also the Asian and African camel and its cousin in South America called Llama actually had extinct fossils in North America showing a complete faunal continuity.

Going back to our discussion of language and its development, the storytelling in children and the earliest ancestors have a common feature. What is a story? Unless there is shared meaning between the narrator and the listener a story is of no value. But if there is a shared meaning it is everything. The proverb says "Believe him who tells his story first, and bring him grapes to quench his thirst." This is to be remembered, and the stories in any culture interpreted as the shared meaning between the narrator and the listeners, the people who share that culture. The puraana and ithihaasa of India are such shared still living stories of our ancestors of foregone era and they tell us exactly what

they believed, how they lived and died and loved and fought for dharma etc. To narrate an experience as a story is a basic human instinct. Bruner thought it as a crowning achievement of human development. There are two modes of thought.

1. Narrative which has concern for human conditions as seen in storytelling of itihāsa, purāna

2. paradigmatic logicoscientific with consistency of purpose and noncontradictory, and believable historical, scientific accounts.

When we view astronomy we have to see it as the second group and when we view itihāsa purāna as the first but we find many of the findings of the second type repeated in the first also because it had become part of shared knowledge for the people. Many of the Leelacharita of the ancients were group narratives as drama/play for masses and the roles were from historical figures like Krishna and

Rama. Donovan in 1996 speaks of the group narrative as drama therapy. The Indian literature, its naataka, leelacharitha etc are in this way well developed educational material for entertainment and social therapy and educative purposes. Stories link the exceptional with the ordinary man (Bruner 1990) The viability of a culture inheres in its capacity for resolving conflicts, for exploring differences and renegotiating peaceful meanings. Stories in a cultural perspective are important not only for children but also for adults in this sense. A narrative like Bhaagavatha, Raamayana sequenced in lines convey such a meaning to Indian society. We come to know of ourselves through construction of an extended self in these stories (Neisser 1988) Bronfenbrenner .U.(1979. Ecology of human development Cambridge Harvard university press)see ecology of human development as progressive mutual accommodation between the growing human being and the changing

properties of immediate settings in which the person(child /adult)lives.The ecological environment is a nesting arrangement of concentric structures contained within the other The structures are micro,meso and exo.Micro for home,school etc meso for these primary groups as well as the peer group and their expectations of what the child/individuals should become/do.Exo is the workplace,professional environment and finally the macrosystem which is community, society,nation and the world as a whole.In ecological transitions we learn to operate simultaneously in two or more levels.This understanding of ourselves,our environment,culture and dharma was perpetuated by language acquisition and in this respect the oldest languages which do exist still with the paradigmatic logistoscience consistency as well as with narrative storytellings for masses in India has to be taken into account.In all other civilizations we find certain features but not

all ,of such intellectual superiority and skill and this continuous consistent behaviour of Indian people is something remarkable in history of human development of language and intelligence.This I do not say because I am an Indian.But because I am convinced from my references and study of the different cultures and the systems of knowledge of India compared to modern knowledge systems .

The geneology and chronology of the Indians are so exhaustive and ancient and there is no other region in the world where such a detailed genetic record is available. What is the importance of such geneology and family tree histories?The book DNA and family history by Chris Pomery (The national archives kew.Richmond,surrey 2004)gives us some insights.In the forward Steve Jones says man live in the past and history of a shared descend binds a society together.That is how Mahabharatha,

Ramayana, Bhaagavatha with its chronologies, the Guruparampara of vedic and upanishadic seers bound the people of India. After independence this bond is being eroded slowly because of lack of Sanskrit studies and the view of some scholars that Indian chronology is only myth and not history. Even without a DNA analysis we can find our genetic descend if we keep a detailed family tree or geneology. How? Each of us have two parents. Each of them again have 2 parents each, so that we have 4 grandparents, 8 great grandparents. If we have 9 generations thus marked, the mathematical data will be

1(me)

2 (parents)

4 (grandparents)

8(great grandparents)

16 (great great grandparents)

32(great great great grandparents)

256(great great great great grandparents)

.....

256X 256 great great great great great grandparents and so on .

The number soon become impossible to deal with. So ,when we get a chronology of 200 generations or more as in the ithihaasa ,puraana and vansaavali of India we must understand the historical sense of such a people. So also, the Y chromosome or set of genes in males which escape the problem show an arrow of mankind that flies from the first man to every man who is alive today, and also to the mitochondrial DNA which traces the mother of all of humanity. (In India both the matrilinear and patrilinear family trees and the intellectual property right of the Gurushishyaparampara are recorded correctly with such an insight into chronology, history and intellectual supremacy of humanity over other living things) Geneics tie humanity as much as it divides it . The most remarkable contribution is how much we as humans are alike, and how we differ from our closest relatives the

chimpanzees ,gorillas,and so on.

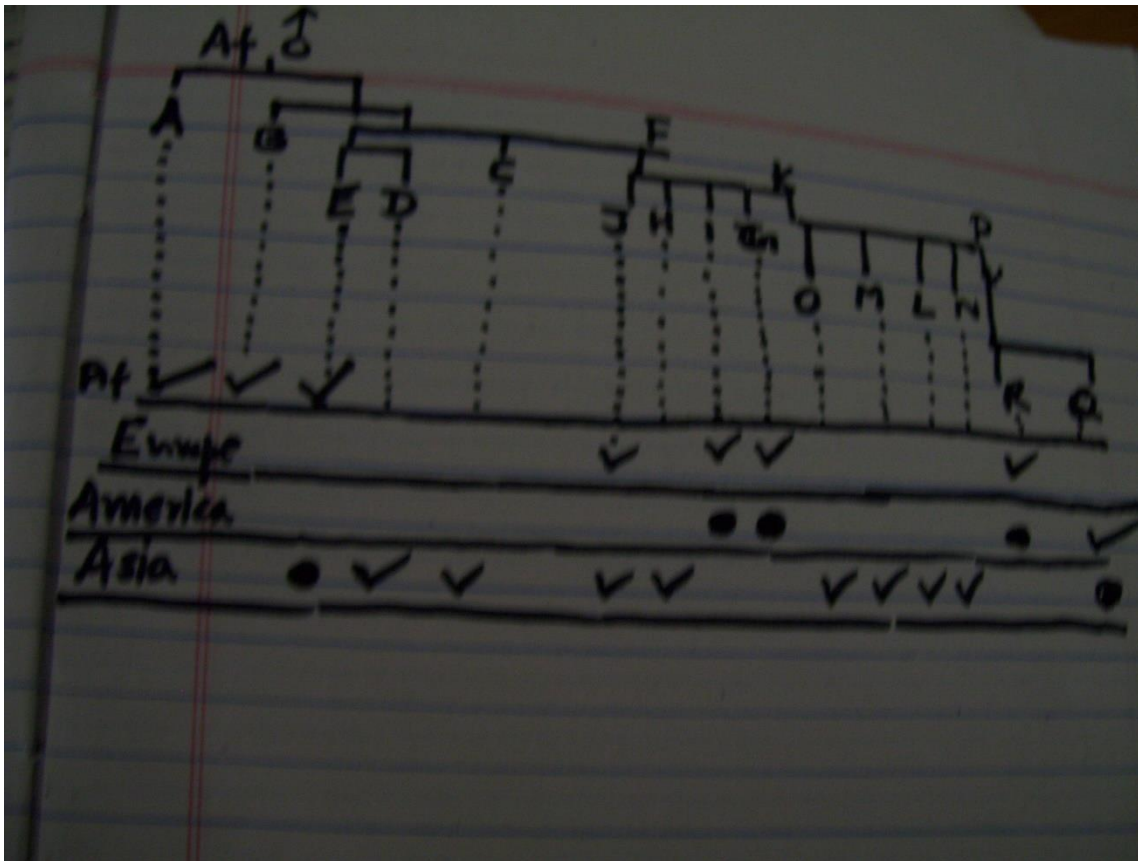
Homosapiens is astonishingly similar from place to place,whatever is the place of birth or language or customs .Average genetic difference between a tribe of aborigines and populations in Wales is less than that of 2 groups of chimpanzees living a couple of miles apart in Africa.Humans have evolved in mind far more than our bodies.Our ability to understand the past is the central part of what makes us so different from the apes.

The past is not our individual past alone,but the past of the whole cosmos and thus the thrikaalagnaana is part of a human beings evolution in India and astronomy and astrophysics and logicomathematical thinking are due to observation of cosmos,of human life,of chronological histories etc .

When we trace 12 generations in our family tree we have 4096 unique ancestors giving inputs into our DNA and if we expand a little further to 20 generations the potential ancestors are raised to one million.Now

calculate the DNA input of chronologies given in the Ithihaasapuraanaas as an exercise. You will get a mindblogging data but it also gives insight into the development of brain and knowledge systems in Indian subcontinent and it will tell you how important it is to correlate these in human history. In his book (page 33) the above mentioned author has given a phylogenetic chart of main Y chromosome clades (a tick mark to show highly visible and a dot to show significantly visible). A clade is a haplotype. The oldest clade is in Africa and the youngest is widely distributed according to the author.

- **Phylogenetic chart**



On page 22 of the same book there is a chart showing climatic changes and human migration in which the author favours a single region migration theory from Africa. He says BP 140000 was an ice age and 120000 BP was interglacial hot /wet period in which there was a failed migration of the African ancestor to the Near East. In 80000

BP the ancestor walked from Abdur beach with his tools to Arabia and from there walked all his way to South East Asia and arrived there in 80000 BP.(which means in 80000 BP there was humans in all the 3 places just mentioned)The ancestor reached Australia from south east Asia by 70000 BP.and in 74000 BP during the Toba eruption reached the Americas as well. 60000 BP the near east migration happen and human reach Europe.Between 60000 BP and 40000 BP North Asian migrants in Benigean refugees,and between 40000 and 20000 BP central Asian migrants reach Europe and in 32000 BP there is end of the Neanderthals .After 20000 BP ice age and interglacial period upto today,the North American population evolved.Accoring to them crossing over the landbridge of Alaska happened in 19000 -15000 BP and population of South America only in 12500 BP.

I have certain points from these two assumptions of the author to make.

1.The human race was simultaneously present in Africa,South east Asia and India in 80000 BP ,that is at the dawn of development of the humans itself.

2.The haplotypes E to Q are seen in Asia .The oldest E to youngest Q (significantly visible)and the others are highly visible.

3.The highly visible group of Asia IGR is significantly visible in Americas.These are also seen in Europe.But Q has a significant pattern.It is significantly visible in Asia, highly visible in America.

4A is the oldest African ancestor ,seen only in Africa.

5.The other two seen in Africa are E and B both seen only in Asia and not in any other continent.

6.These are against the theory of migration to Europe ,but show a feasibility of a common ancestry between Asian and African people .

7.If we take a migration history by searoute with help of monsoon winds as plausible,the migration between continents in early phase become more comprehensible and believable. The common ancestor from India /Africa migrates and makes contacts and genetic offsprings along seacoasts and make the present pattern(The other concept of landroute migration is not plausible and this is also applicable to Aryan invasion theory of India which is absolutely foolish).

8.History is a record of man and his accomplishments from the time he ceased living merely as an animal and became a human being and can be classed under two heads ,the prehistory (archeological evidence and broad preceding periods more than one million years)and the history (documents written/oral traditions of a people.)

9.Homoeructes of Java ,china and Africa lived 1100 000 years back.Homohabilis lived 175 0000 years back in Tanganika

olduvai gorge. Related Australopithecans in Africa and South Asia the same period. Proconsuls of 24000000 years back were the ancestors of Australopithecans of both Africa and Asia.

10. From it the late minocene/early pleiocene ancestor of India Ramapithecans who lived in 14 000 000 years back. The Kenyopithecans of East Africa and Oreopithecans of Italy are related species.

11. At least for 2 50000 years homosapiens have been living on earth.

12 Chellian type, acheulian handaxe, cleavers (North, central and south India) were found in India. In Punjab acheulian handaxe in a deposit of the second Himalayan glaciation period was found out. Crude pebble industry sites were seen in Son valley during the 3rd Himalayan glaciation period. Upper Paleolithic tools in central and north west India in cavesites and rockpaintings of early periods.

All these facts and figures talk for themselves.

Today we are living in a world of quantum mechanics. And there had been several quantum measurement problems which had to be resolved. In 1950 Hugh Everett proposed resolutions to them. What is a quantum measurement problem then? The behaviour of basic constituents of matter is counterintuitive. Therefore the standard theory of Quantum mechanics also is counterintuitive. But that is not the problem. The problem is that the standard theory cannot be taken to provide a complete and an accurate physical description of the odd behaviour that it is supposed to describe. The basic constituents behave in a fundamentally random way. Sometimes like particles (in cloud chambers tracks and marks on photographic films) and sometimes like waves (seen as interference phenomena different from midsized systems). A

particle has position ,follow definite trajectory ,not spread like a wave on a pond. The interference phenomenon show that the movement is like waves when noone is looking and differently when someone looks. A dual behaviour and therefore two dynamic laws for the same basic constituent. A dwaitha behaviour for an adwaitha in the language of the Indian scientist.

The two dynamic laws are

1 One describe evolution of a physical system when there is no one as an observer. Just as the Naasadeeyasooktha of Rgveda points out and the Upanishads have been trying to discuss and explain.

2. Evolution when someone (an observer) looks at it and see it .(when a seer /rishi see it)The drishya of a drashtaa in Sanskrit.

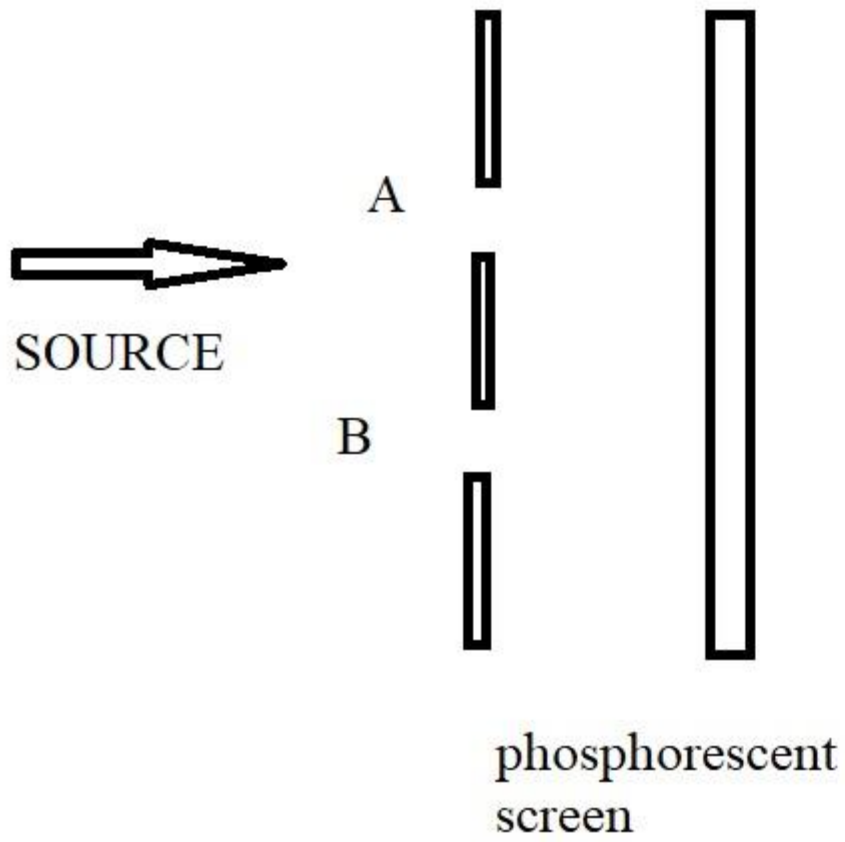
These two laws and the criterion is the ultimate source of measurement problem for the quantum mechanics. And this was the problem of the Indian scientists of yore and the resolution was by the advaitha of the

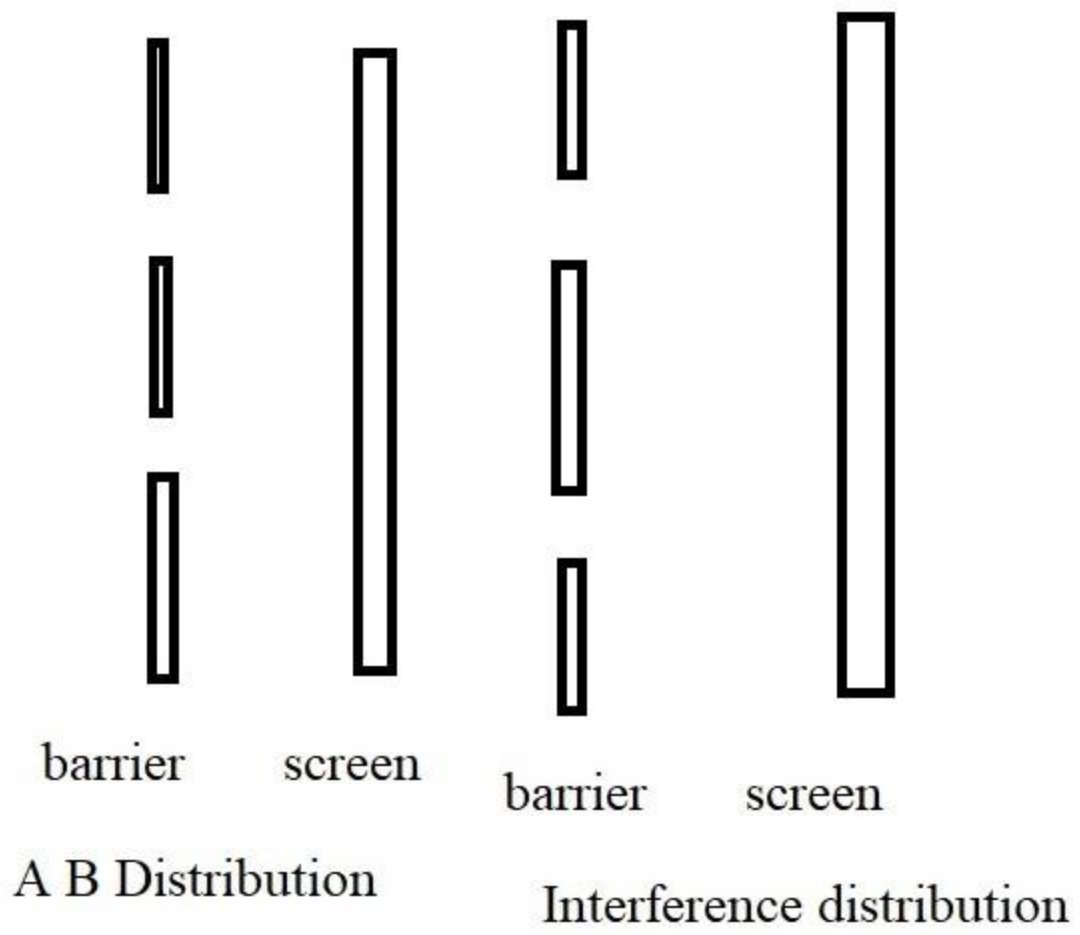
drashta, drishya and the act of observation (darsana). How did Everett try to resolve it?

To understand that we will discuss the two examples of interference effects .

1. The two-slit experiment
2. Wegners Stern-Gerlach experiment.

Figures





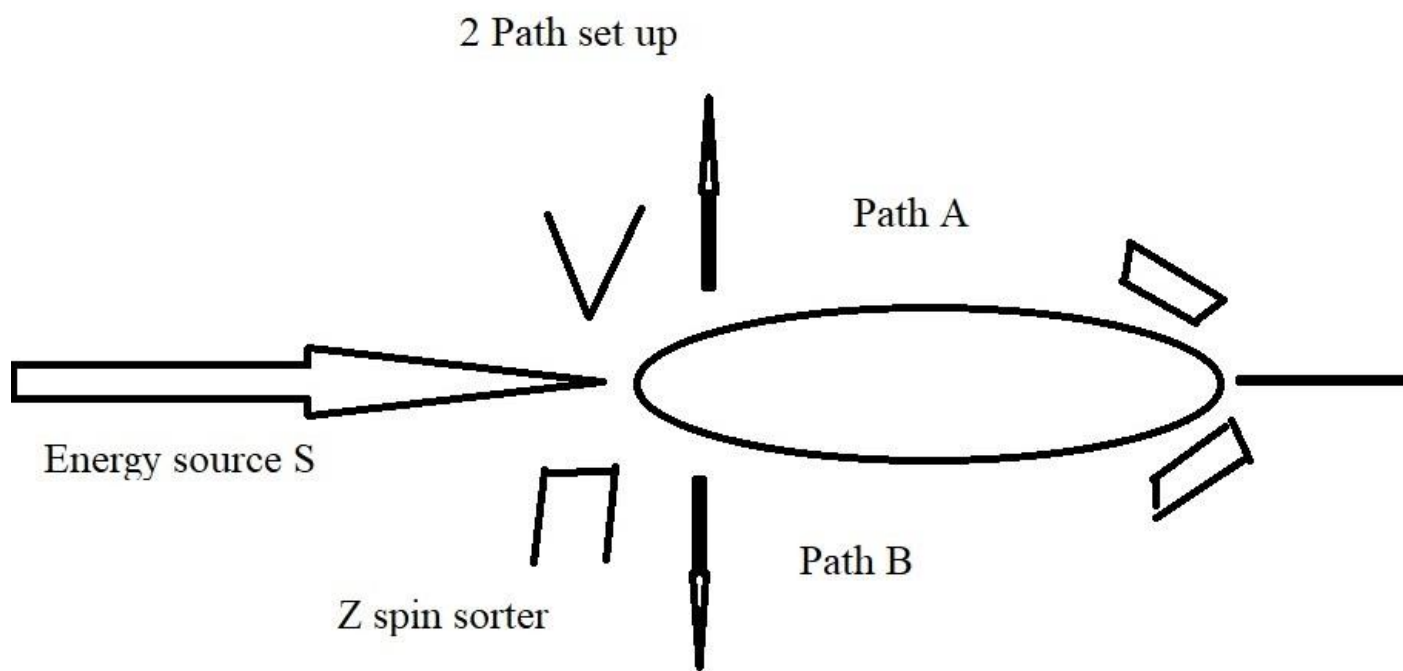
In these figures when light from an energy source pass through slits A and B and fall on the phosphorescent screen is shown. If B is closed all particles go through A called A distribution and if A is closed B distribution pattern. If both opened the expected pattern is A or B distribution but what we really get is Interference distribution or a wave pattern. The particle follows a superposition of different trajectories. It moves as wave. No determinate pattern for wave. It spread out interfere with each other between the barriers and screen.

When observer looks to see which slit each particle pass through the wave function collapse to eigenstate of passing through either A or B The interference effect is destroyed. A or B distribution obtained .

Spin properties of spin $\frac{1}{2}$ systems

A particle can be in superposition of having different momentum, energies and spin properties. Spin $\frac{1}{2}$ particles with nonclassical behaviour of matter are examples and this is according to the quantum uncertainty of Heisenberg. An electron with X spin have spin $\frac{1}{2}$ particles with X spin UP or X spin Down. and Z spin UP or down. Electron with X spin down has Z spin up $\frac{1}{2}$ the time Z spin down the other $\frac{1}{2}$. One with Z spin has X spin up $\frac{1}{2}$ the time X spin down ,the other $\frac{1}{2}$.

Figure



Then we expect at $I = \frac{1}{2}$ of the Z spin particles up and $\frac{1}{2}$ Z spin particles down. But actually all are Z spin up. When we look we see an electron in one path or another. Our looking/observation cause the statistics to change to $\frac{1}{2}$ up and $\frac{1}{2}$ down at I .

The curious behaviour of neutral K mesons

Pai meson negatively charged

P proton +ve charge

Particle and K meson both neutral. On the left both particles have strangeness zero

Particle has strangeness -1

K meson has strangeness +1

If particle is + antiparticle is -ve. If particle is strangeness -1 antiparticle is strangeness +1

For a K meson antiparticle is K^0

meson. Neutral K behave both as K^0 and K^0 meson at the same time **simultaneously**.

(This is the maaya of the universe. One has behaviour of two. Brahma simultaneously

appearing as nondual and dual,as siva and sakthy as prapancha and beyond prapancha in a wavy ocean of milk on an anantha, anaadi state)

The two dynamic laws of von Newmann – Dirac theory.

1.The linear wave equation describe time evolution of all unobserved system and account for the wave like behaviour (of the wavy milky ocean)

2.collapse dynamics described when time evolution is being observed by the first observer,continued with every observer .(and described by each in his words and experience,introducing relativity and subjectivity)we find properties to a system only when we observe and study it.

This was described both for paramaanu (kanaada and vaiseshika system)and for the observable gross multiverses in astronomy, in medicine(biological system).The laws are applicable to both microscopic quantum

system and also to gross systems of universes .

Everetts relative state formulation of the QM

Huge Everett said

- 1.Drop the collapse dynamics from standard formulates of Q.M
- 2.Take the resulting theory as providing a complete accurate description of all physical processes without exception
- 3 deduce standard predictions of QM as subjective appearances to observers treated as systems within the revised theory.

In 1600 Sir Isaac Newton developed classical mechanics. There were no challenges to it for next 200 years. In 1800 there was a view that classical mechanics cannot explain many things observed in world. By 1920 QM developed. The basic principles by Werner Heisenberg in 1925 called matrix mechanics were further

developed by Wolfgang Pauli and Dirac. Schrodinger had an alternative approach for general theory of QM. Based on De Broglies suggestion that relationship between photon (light quanta) and EM waves phenomenon were postulated to explain photoelectric effect ought to be generalized to include all material particles should be expected to exhibit wavelike properties called wave mechanics. Schrodingers wave equation was linear and deterministic. If one know the initial wave function and Hamiltonian energy properties of the system, then one can predict what the wave function would be at any time in the future or what it had been in the past.

I must here state that it is what the Indian astronomers called Thrikaalagnaana and the predictive science of astronomy and medicine are both based on it.

Considering movement of a wavepacket representing an electron in a Harmonic potential the wave equation complete and

accurate description of true evolution of all physical systems. But the Harmonic oscillator exception rather than rule and his dynamics was not universally valid. Max Born stated that the particles follow probability law. Probability propagate according to law of causality. Acausal indeterministic processes could only have probabilistic laws. The evolution of these probabilities can be correctly ascribed by the causal (deterministic) Schrodinger dynamics. Therefore QM acquired 2 dynamic laws. Probabilities in classical thermodynamics is due to lack of our knowledge. In QM the probabilities due not to the lack of knowledge but result of fundamentally random acausal processes that could not be eliminated from the theory. Heisenberg agreed that QM establish the failure of causality.

Dirac said nature chooses the component of the wave function that represent the state of the world. Heisenberg said it is the observer

who makes the choice. The observation is the choice of the observer who makes the choice. The observation is the choice that destroy the interference. But what makes an observer choose his/her activity? These questions I have seen repeatedly asked in the Indian scriptures and according to Indian scientists the resolution of the problem is in the fact that the observer as a biological system is also part of the prapancha ,of nature and therefore there is no contradiction in these two statements. To that we will come later.

Von Newmann 's view is that while causality is an ageold way of thinking of all mankind it is not a logical necessity and it was not reasonable to sacrifice a physical theory that made such good empirical predictions for the sake of causality. Pauli said the appearance of a definite position X_0 during a subsequent observation and the statement of "the particle is there" is then regarded as a creation outside the laws of

nature ,eventhough it cannot be influenced by the observer.The natural laws only say something about the statistics of these acts of observation.For Von Newmann it is a fundamental requirement of scientific viewpoint ,the socalled principle of psychophysical parellemism,that it must be possible so to describe the extraphysical processes of the subjective perception as if it were in reality in physical world.He gives the example of measuring temperature.A causal chain of events from physical system whose temperature is measured ,to the glass of the thermometer containing mercury, length of column of mercury,path of light reflected off the column,image of Hg column on observers retina ,the optical nerve connections,chemical changes occurring in the brain of observer making the measurement.At some point in the chain we must say that this is perceived by the observer .Therefore the world has to be divided into two parts ,the one being the

observed system and the other the observer (again the drishya and drastha of Indian system) But the boundary between the two parts is arbitrary to a large extent . (subjective observer and objective world) The observer has made a certain subjective observation of an objective world .

Since boundary is arbitrary QM is compatible with principle of psychophysical parallelism. The measuring devices are ordinary physical system however sophisticated they are. And observers are conscious (Wigner) Even a cat, a mollusk, a rhododendron is having consciousness and in that case can they as observers cause a collapse? It is necessary to introduce an extraphysical (mind) in order to solve the measurement problem. Here comes the Budhi, Pragnaa, and the language (bhasha, dwani etc with syntax and meanings) and the bodhi which a human being has but no other sentient being has.

Everetts universal wave mechanics logically selfconsistent description of universe in which several observers are at work. Such system is conceived as automatically functioning machines (servomachanisms) possessing recording devices(memory)and which are capable of responding to their environment .The behaviour of these observers shall always be treated within the framework of wave mechanics. Probability assertion of process 1 subjective appearances to certain observers in correspondence with their experience. The formal theory is objectively continuous and causal ,subjectively discontinuous , probabilistic .It justify our use of statistical assertions of orthodox views ,enables us to do so in a logically consistent manner ,allowing for the existence of other observers. Pure wave mechanics(process 2 only)is a complete theory .The wave function obey linear wave equations everywhere at all times ,supply a complete

mathematical model for every isolated physical system without exception. Every system is subject to external observation as part of a larger isolated system.

The collapse postulate (process 1) would be recaptured as descriptive of the subjective experience of observers who are treated as ordinary physical systems within pure wave mechanics. A concept of relativity of states developed for treating and interpreting the quantum description of isolated states within which observation processes can occur.

Each model observer (whether Varhamihira, Vasishta, Paithamaha, Poulisa, Einstein, Sankara, or Schrodinger or Kepler or you or me for that matter) is an isolated system in interaction with other similar systems (separated in timespace or not) and changes occur in observer as a consequence of the interaction of the surrounding systems.

These are interpreted as experience of the observer. The experience is found to be in accord with statistical predictions of the

conventional external observation formulation of QM. That is physical changes occur in physical system representing the observer tell us what the observer experienced. The observer as a subsystem of the composite system of observer+observed object .

After their interaction there will not exist a single observer state .The superposition of composite system states only ,each element which contain a definite observer state + definite relative object system (each an eigenstate of observation)state.The experience is a mental state of the observer.

Everrett considers the observer as a purely physical system (knowledge ,experience selected by physical state of the memory registres)compared to punches in a paper tape ,impressions on a magnetic tape or reel,configurations of a relay switching current or configuration of the brain cells.

After observation the composite system of objects+observer will be in superposition of

states ,each element of which describe an observer who has perceived that the objects have nearly definite positions and momenta and for whom the relative system state is a quasiclassical state.and furthermore to whom the system will appear to behave according to classical mechanics if his observation is continued.We see,therefore how the classical appearance of the macroscopic world to us can be explained in the wave theory (in Naadabrahma theory of India).

We have seen astronomers trying to determine position of celestial objects with accuracy in classical mechanics and in Indian system alike.But position is a physical property(a guna).When we try to determine the position we find the position changing or being changed by the very act of observation for which we have to make corrections which were being accurately tried by all the Indian systems of ancient

times and this was only a recent feature in western science .Frank Tiplers manyworld theory and Dewitt-Grahams interpretation of it as splitting worlds is interesting.Universe is constantly splitting into a stupendous number of branches all resulting from measurementlike interactions between its myriads of components .Every quantum transition taking place in every star ,in every galaxy ,inevery remote corner of the universe is splitting our local world on earth into myriads of copies of itself (Dewitt).

Dewitts first reaction “-The shock I experienced on first encountering this multiworld concept .The idea of 10 to the power of 100 slightly imperfect copies of oneself all consistently splitting into further copies ,which ultimately become unrecognizable, is not easy to conceive or reconcile with commonsense.Here is scheizophrenia with a vengeance”.But then he saw the logic of the many real but unobservable worlds .

The many worlds without splitting is now called the **many threads theory** .In 1988 Albert and Lower put forth the **many minds theory**. This was the opposite of a single mind theory. **The one-many problem of mathematics and philosophy (ekam-anekam in Sanskrit)** was getting repeated after several centuries in the European mind. Every observer, every sentient being or sentient physical system associated with not a single mind , but rather a continuous infinity of mind is its postulate. Each evolve independent of his /her other minds but the minds beliefs about its own past ,mental states are typically reliable. Each of the observers mind represents a different perspective or view of the physical world. But while each mind see a single determinate and consistent series of events , the global observer, as a collective mind of all these minds ,has many mentally incompatable experiences. But minds are not in superposition ,because minds are not

physical bodies. The time evolution of mind is probabilistic. Probabilities are completely objective, although they do not refer to physical events but always to sequence of states of individual minds. Each mind follows a random trajectory with probabilities given by the mental dynamics, one should eventually expect the memories of almost all of an observer's mind, in the norm-sequestered measure, to exhibit the usual quantum statistics. The many mind theory meshes well with relativity. Since one can read off the global mental state of an observer from universal wave function and since the evolution of wave function can be expressed in a covariant form, so can global mental dynamics. If you are not reminded of Krishna's words in the Githa to Arjun that my mind sees many pasts, many histories and many I's and Yous and everyone, and you see only one, with these new theories you haven't understood what is meant by Indian and western science alike in this respect

.The Chandraanana /Brahma conversation of Goloka in Gargyasamhitha is another example related to astronomy and astrophysics as subjective ./relative to an observer.

One start by supposing scientific enquiry is possible. Our beliefs about ours and others measurement results are all true. If so, whenever he is in an ergenstate of making such a report, then the suggestive properties of the bare theory tell us what properties the mental state of observer must have and how it must evolve, in as much as they tell us what the observer will repeat about own experiences and relates it to other observer's experiences. This is called transcendental approach in quantum mechanics and this approach fully determines the auxiliary dynamics. **From many minds we have the next concept-many histories.** Destruction of simple interference effects by environmental

correlations is decoherence. This explains the determinate experiences of observers.

Difficulty to distinguish pure states from mixtures cause it. The process of decoherence effect states of brain are, relevant observables of individual neurons, chemical composition and electrical potential and these processes related to a macroscopic organ (brain) obey classical dissipative equations of motion. Thus any quantum superposition of states of neurons will be destroyed far too quickly for us to become conscious of the quantum going on. Decoherence applies to our own state of mind. Environment constantly changes (the property selected have as determinant is changing) Therefore the property selected as determinate also must be changed. (The changeless Brahma and changing Prakrithi of Indian concept is again appearing here) The environment and the mind are constantly changing. Therefore the observers recordings, his data, experiences, beliefs also

should be changing. Therefore not only many minds but many histories occur for each person. Many histories hypothesis was built upon Everretts many worlds interpretation. It has 3 additional crucial ingredients.

- 1. Notion of set of alternative coarse-grained histories of quantum systems
- 2. decoherent histories in a set
- 3. Their approximate determinism near the effective chemical limit.

In Gell-Mann and Hartle's many histories concept "In a whole theory ,no fundamental division into observer/observed.

Measurements and observers cannot be fundamental to a theory that seeks to discuss universe when neither existed." It is at this point the creation of Universe in the veda and other Indian concepts and in Indian astrophysics starts. Where the modern science has ended up from its sojourn from first centuries of Christian era /16th century CE /to present, we find Indian science

starting with a time when nothing existed in/as universe..That means ,to reach that stage it must have taken almost the same or even more years and the civilization is as old as humanity and its thought processes.All predictions in science are honestly and generally ,probabilistic predictions of the true histories of particular events in the universe. There are **two rules for the many histories theory**

- 1.set of alternative histories of universe assigned approximate probabilities
- 2.What these probabilities are(explained in context of Heisenberg picture).

Is then quantum theory a flight from realism? Christopher Norris in his book (quantum theory and the flight from realism,philosophical responses to QM ,Routledge 2000)discussed this question .

Issues from Einstein till now are

- 1.wave particle dualism

- 2 uncertainty of measurement of particle location and momentum
- 3.observer induced collapse of wave packet
- 4.evidence of remote superterminal (faster than light)interaction between widely separated particles.

And the multiverse theory is the only plausible one,physically and logically consistent solution to various wellknown paradoxes of wave-particle dualism ,remote simultaneous interactions ,observer-induced collapse of wavepacket.Einsteins dilemma was that the quantum theory may not correlate with relativity.But now with this many universe ,many mind,many history theory it do correlate with relativity as well.The alternative view was that the measuring instrument or apparatus (yanthra)have influence on quantum system.Against this is the relativistic conviction –measured value must pertain to objective,observer-independent properties of

physical system (not dependent on observer or instrument but on the object)If you look at the purushanthragnaana and vasthuthanthragnaana of Indian scientists the very same thing you can see there too.

According to the hidden variable theory the quantum uncertainty tells us when we measure one electron ,or one thing ,and you are having complete ignorance of the other.

The situation changes if the polarizing devices are set up at indeterminate (which means 45 degree angle)as in Bells proposed thought experiment. What happens if the second(down)electron is passing through a magnet set at 45 degree from vertical?

. Electron comes out in one of two directions defined by magnetic field.NE and NW .The probabilities of these two are not equal.

15% chance to NE and 85 % for SW.The measurement of first up electron does not till the outcome outcome of the second.Neither does it give a 50% 50% result.The measurement of the second is probabilistic.

Suppose ,the gross physical system –the earth-is taken as a magnet,(all Indian systems take it like that)and this rule is applied,the NE and SW magnetic fields can be observed directly as the course of the two monsoon winds and the best place to view /observe it is the south Indian /sreelankan areas.It was this prolonged experience of observation which made these people so scientific and mathematicologically thoughtful about the earth and its environment, planetary laws and the calculation of it by long observations.This was the power behind their seatriade and ocean crossings also.And these ocean crossings had started from the dawn of time , when the homoeructes and australopithecans lived .Such a prolonged experience of one's environment and its laws had made the languages and the scriptures and time calculations and philosophy of this part of the world.

The multiverses without an end (anantha-the endless serpent on which Naadbrahma sleeps) has now reemerged as quantum multiverses of Deutsch. It is a theory of multiverses in quantum time, and these parallel universes are not a problem but a solution for all the problems of it. Realistic thinking can be of two types depending upon who thinks.

- 1. The every day commonsense thinking of common man which is called intuitive
- 2. specialised philosophicoscientific - from Galileo to Einstein, From Paithamaha to Subramaniam Chandrasekhar

In both we may find many worlds, many minds. Its strongest appeal is premise to resolve the issue of free will vs determinism –the issue that preoccupied philosophers, all reflective individuals, especially physicists and physicians. In Wittgensteins concept

- 1. language game with different criteria eg physical sciences, determinate the causal explanatory world view
- 2. Ethics, aesthetics, law, religion, human/ social sciences, possibility of free will choices ,actions, commitments. This is resolved.

G.E.M Auscombe said the old clash between free will and doctrine of scientific determinism is being solved by quantum physics. In classical spacetime Deutche wrote: "something happens to me at each particular moment in my future .Even if what will happen is unpredictable, it is already there, on the appropriate crosssection of spacetime. It makes no sense to speak of my changing what is on that crosssection .Spacetime does not change, therefore one cannot within spacetime physics conceive of causes, effects, the openness of future or free will." On many world theory he wrote: What happens to me at every moment in my future existence determined in advance ,for that

version of myself who inhabits the singular spacetime turnover that I conceivably inhabit , not for the multiple versions who really would have branched off at various points along the way. From my perspectives (narrowly classically) no escaping paradoxes of time and choices. (General relativity works with such a classical single universe scheme)

What we call free will then is an illusion, a subjective mirage , created by random quantum phenomena of all the known decisions of our copies in all the multiverses or all the janmaas in all previous yugaas and the yugaas to come as in the Gita.

- I made a decision.
- I could have chosen otherwise.
- I am good at making decisions.

These three statements of doing differently or making choices differently or all the possibilities thereof /the maximum range of worlds in mind as well as achieving in maximum number of possible worlds as

rebirth /previous birth becomes plausible with this .As Leibniz said”All is for the best in this best of all possible worlds”The alternative worlds are beyond our range of perception and intellect but all we require is a sovereign intellect of collective consciousness or Brahma to make us remember them at various levels of our memory or contingent truth.Realism is

- 1.Alethic (truthbased /objective)
- 2.Epistemic(knowledgebased /verificationist)view

Now we see both are applied in Indian and modern sciences alike .The sound transmission as waves construed in objective physical term (lay an impact and propagate through fluid medium)and perceived by us through excitation of auditory system gave rise to theory of Naadabrahma,the string theory of 28 stringed veena/lyre of Devi Saraswahy in India and this is now being

reinvented/rediscovered by modern scientists.

DYNAMICS OF RELATIVITY

Relativity and quantum mechanics made an impact on scientific thought and are the greatest intellectual achievements of the present century. The new theories do not make old theories obsolete. Special theory was not a new theory but an extension of Galilean relativity which is classical physics. In Galilean relativity Newton's laws are correct.

- 1. special relativity as a process of normal development in physics and hence classical physics does not become obsolete with it.
- 2 The complaint that it is a difficult subject can be overcome with the right habits of thought.

Newtons laws of motion

- 1. A body (dravya) continues in a state of rest (visraanthi) or uniform motion (samagathi) unless acted upon by a force (sakthi)
- 2. The rate at which the momentum of a body changes with time is proportional to the force acting on the body and is in the direction of force.
- 3. To every action there is an equal and opposite reaction.

The body can be a point mass, particle, a body of finite size. Newton's law 1 is qualitative (Guna and its samarasya or balancing) while law 2 is quantitative (gathi, pinda, sakthi, dhoora, kaala and their parimaana -) since movement, mass, energy, distance, and time and their measure are measured in law 2.

The central role of newtons second law is that

- 1.It define concept of force(sakthy/energy)and mass.(pinda)
- 2.It govern the motion of particle subject to a given force.

As I have shown while discussing Panchasidhanthika ,these were the very same laws which Varahamihira was explaining in his karanagrantha and it was not his discovery either but the ageold knowledge of India.(The language was Sanskrit ,which was known only to Indians and hence the others didn't understand it.If we explain the laws of Newton or Einstein in English to a tribal person in remote Africa the same thing will happen.)

Sakthy=mass X acceleration

To measure acceleration one has to measure length and time.The position of a particle or a graham at any time calculated if we know the initial state of the particle.So they tried to fix a initial state and position for all

particles. And then came the possibility of a time when there was no observer (naasadeeyasooktha) and Upanishads discuss this problem in detail. And also the possibility of 14 mirrorimage universes (28) as replica of the others and the many histories and many copies of the beings in each and this was described by punarjanma and the karma theory which is the 3rd law of Newton. To every karma there is an equal and opposite prathikarma and one has to go through that if not in one world in the other is the punarjanma theory.

Force or sakthi is the most fundamental principle and the Thantra of India speaks of it in detail. The Electromagnetic (vidyuth, kaanthika which attracts) gravity (guruthwa that attracts) which are the conservative forces in a mandala (spherical geometry) acting as an inverse square law is as old as Indian thought. The prabhala and durbhala forces of nature which sometimes change

position and fight for ever for supremacy is the forces of light and darkness. Newton came to the knowledge of force between two bodies from Keplers laws of planetary motion .The amount of motion of a body is constant in inertial mass. When the two bodies are separated by a distance they develop a gravitational force of attraction .The ardhanaareeswara concept and male /female analogy between sun /earth attraction (siva/sakthy)came like this. When there is attraction from earth, the weight of body increase and when earths attraction is totally absent it is weightless and go to heavens .So, the life on earth was due to Guruthwa, and after death loss of athma was by its laghuthwa .(by anumaana from other physical objects)Samarasya(balance)or principle of equivalence between active and passive gravitational mass of the particle and between the thriguna(3 qualities)is the basis of all science in India. The inertial mass is gravitational mass (shiva)and this was the

fundamental postulate leading to general theory of relativity of Einstein. In relativity spacetime is infinitely divisible and continuous. The zodiac or raasimandala of Indians share this faculty .It is divided anantham times but is still One .(Sakthy and Brahma simultaneously) In classical physics space is Euclidean with geometric proportions , for every point of the universe. The three dimensions, triangle, triad of numbers, thrimurthy, are representatives and so is thriguna and its balancing represented in 43 sakthithrikona of the inner part of sreechakra. In Galilean –Newtonian system time is dynamic everrolling stream (universal) We know length is a distance between two objects/points. Difference in position also alter the distance. (displacement) But physics does not call it length interval, but about time it use the term time interval. The measurements of (observational as well as mathematical)planetary positions right from

Paithamahasidhantha knew these laws is what I want to stress here. Every measurement use two comparisons or two points at least. Align them with scale marks on a measuring rod, the zero set by a process of comparison on the measuring rod. Everyone know zero was a discovery of India. A zero point on earth as Lanka also was theirs for measuring universe they used earth as a measuring rod/and a measuring sphere. Measuring the length of a measuring rod/measuring sphere was being done first. Time of measurement of the position of each end of the rod is then important. If the measuring instrument is at rest can make comparisons at two ends at two different times by the same person. But if it is moving then the time at which each comparison is made is of importance. The importance of this relativity is given by giving measurements at 4 points of the globe as given in Panchasidhanthika and the time of measurement of each, Lanka serving as zero.

With time difference of t , in a velocity v , the error $\pm vt$ will be there. Also whether we did measurement at the front of the rod or the back first matters. Because the measuring rod/globe has length contracted in direction of motion. Hence reference point zero as fixed as stationary and making simultaneous measurements in any frame other than that and comparing with it was adopted (as we now do with Greenwich from only 1600 CE)

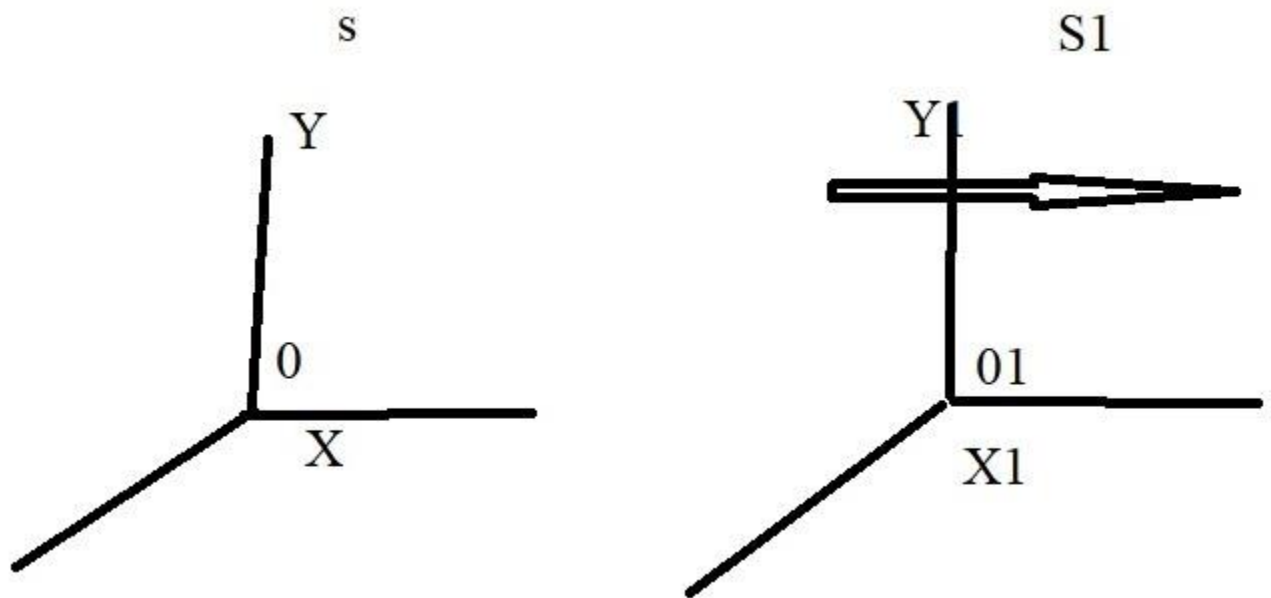
Who makes the measurements? The observer. The observer is defined as any experimenter, who is equipped with certain knowledge to make measurements of length, time, and relative positions of bodies which are many (not just two) moving or at rest, relative to his frame of reference (Lanka on earth, Ujjain on earth, Greenwich on earth and so on)

Now the question comes why Lanka and why not Ujjain/Greenwich as zero?

We must understand a coordinate system as a mathematical abstraction. But for a surveyor the frame of reference is on the surface of earth (geocentric) And the origin of coordinates for study are chosen to be at sealevel .In relativity we must choose a frame of reference which does not itself add anything to dynamics of the system which we are studying. So the choice is that class of coordinate system in which the body obeys the first law of Newton which is qualitative. In relation to Indian subcontinent Lanka occupies such a position, and the study of energy as wind direction (monsoon) and wave mechanics all can be studied and it is a landmass nearer to equator than main Indian landmass at the same time having same longitude. Thus the choice is Lanka as inertial frame of reference for Indians. What is not an inertial plane/ A rotating coordinate system is not. (which travel in curved path) A curved path implies existence of force .Earth is a rotating system. For a pendulum earth is

an inertial frame ,the rotation of earth being undetectable.For India,Lanka is an inertial frame with a straight line distance through sea and having only very negligible difference in rotation and time.Lanka then is a mathematical abstraction and the central point of Indian astronomers which meets all the requirements.And Lanka was chosen as inertial frame of reference even before the time of Raavana,because Ramayana mentions the importance of this as the abode of the richest person ,Kubera Vaishravana ,son of Vishravas and Idavida ,and Raavana was only his younger stepbrother .So even before Threthayuga this spot was selected as center of earth for all calculations of astronomy.

Figure



S and S1 (lanka/India), the inertial frames in std configuration has properties

1. identical
2. one moves relative to the other with speed v
3. motion of origin of s_1 along X axis of s
4. X and X_1 are coaxial
5. at $t = t_1 = 0$ origin of s and s_1 coincide.

In Galilean transformation we have to specify an event saying where and when it happened. (at what longitude/latitude and at what time relative to lankan time in case of a birth in India) specify position of point P in spacetime continuum so that one can find out how the event appears from two inertial processes of reference s and s_1 . One event but coordinates differ in two different processes of reference. It assumes the invariability of time $t = t_1$. Time is same for observers in different frames of reference, but this Galilean transformation is not time in our universe according to relativity.

Collect all the results for coordinate transformations between two frames
 summate the relationship between two observers of the same event as measured in S and S' (say Lanka and Ujjain) $x' = x - vt$ is std Galilean transformation which was used in eclipses. Galilean invariance of Newton's law is law 2.

Principle of Galilean relativity

- 1. from a moving vehicle
- 2. vehicle at rest

The movements should be the same in both. (2nd law) The laws of mechanics are Galilean invariant. No mechanical experiments can be used to tell whether an inertial frame is moving or at rest. (principle of special relativity by replacing the word mechanics by the word physics)

.

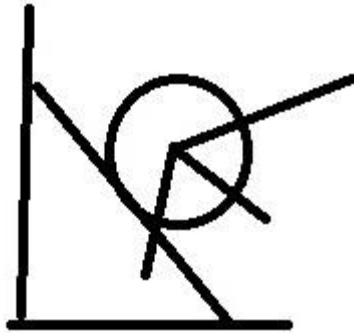
Relativity of speed

Velocity depends upon frame in which it is measured. (In relativity the speed of light in vacuum, so no dependence.) Motion of

particle sliding down a slope in S_1 relative to S is on an inclined plane with constant speed v . Find horizontal position of particle as function of time. Suppose the initial displacement and velocity is zero. In S inclined plane moves with velocity v and in S_1 inclined plane is at rest

Figure.

Particle slide on inclined plane



Displacement at time t of particle with mass m , the distance down the slope at anytime t and t_z (intermediate times) we have built the inertial conditions into integrals. Therefore there is no need to evaluate separate constants of integration. To resolve displacement along X axis ,

In s according to Galilean transformation

$$X = x_1 + vt$$

$$\text{So, } x = \frac{gt^2}{2} \cos \theta \sin \theta + vt$$

Is the horizontal position of the particle relative to S at any time t .

Conservative laws

Three of them

- 1 Momentum
- 2. Energy
- 3 Angular momentum.

Invariance under translation in space implies conservation of momentum

Invariance under translation in time implies conservation of energy

Invariance under translation in continuous rotation implies angular momentum. How are these consistent with Newton's theorems? The orbits of planets and that of spinning tops behave alike. Consider the motion of a particle 's relation to a fixed point (Dhruva is the Sanskrit word for it.) This is angular motion and is distinct from linear motion. Linear motion about a fixed point is linear momentum (angular momentum) and the first movement of applied force become relevant quantities. Generation of law 2 to angular motion

Angular momentum l of particle about point zero.

$$L = \mathbf{X} \times \mathbf{P}$$

\mathbf{X} is vector giving position of particle at any time relative to o and \mathbf{P} is its linear momentum

$dL/dt = \text{torque (moment of force } F \text{ acting on particle about a fixed point zero)}$ This is analogous form of Newton's law 2 for angular motion. If torque is zero, then

angular momentum l of particle is constant.
(conserved as in planetary motion) Thus for
angular motion, conservation of angular
momentum is analogue of Newton's law 1 for
linear momentum. In the two particle system
(dwanukam) the center of mass and relative
coordinates, if the two particles move in
straight line

$$F_1 \rightarrow \text{Mass 1} \rightarrow F_{12} \quad F_{12} \rightarrow \text{Mass 2} \\ \rightarrow F_{21}$$

X_1 and X_2 positions of M_1 and M_2

R position of CM (center of mass)

$$CM = (M_1 + M_2)R = (M_1 X_1 + M_2 X_2)$$

Extend to velocity.

$$M_1 v_1 = M_2 v_2 = \frac{d}{dt} (M_1 X_1 + M_2 X_2) = \\ (M_1 + M_2) \frac{dR}{dt} \\ = (M_1 + M_2) v$$

Velocity of center mass $= \frac{dR}{dt}$

Assuming total mass of system as constant
laws 2 and 3 of Newton in terms of CM
coordinates as,

$$(M_1 + M_2) \frac{d^2 R}{dt^2} = (m_1 + m_2) \frac{dv}{dt} = F_1 + F_2$$

That is CM moves as if the whole system mass is concentrated there and acted upon by total external force. We can express velocities of two particles relative to a CM velocity. If we specify the velocity of CM relative to some frame s_1 we can regard center of mass frame as s moving with velocity

$$V=R$$

Then particle velocities can be specified in S_1 and subsequently transferred to S by Galilean transformation. The kinetic energy of the total mass will be sum of individual kinetic energies relative to center of mass. Thus the sum of energy of two land masses, the sum of energy of two celestial objects (or of several) can be found. Kinetic energy of s_1 is less than s by

$$\frac{1}{2}(M_1+M_2)V^2=\frac{1}{2}(M_1+M_2)R^2$$

For potential energy analyse the two as a single particle. Just by addition of the two potential energies we get it. When there is

relative motion acceleration of the relative coordinate $r=r_1-r_2$

Only an interaction force between the two bodies ,no external force.To measure kinetic and potential energies acting between India and Lanka at sea level as waves and as monsoon winds and waves ,the CM and relative coordinates for these two particles of mass M_1 and M_2 are required. The same rule is applied to earth and sun, earth and moon,and other planets in spherical geometry.Now in figure consider the straight line of Nalasetu (Raamasethu) in the sea between India and Lanka and see it as a measuring device for distance as well as sealevel .Whether it is natural or manmade , it has served this purpose. Conservation of energy of two particles in terms of reduced mass.

Points M_1 and M_2 form a conservative system when the only forms are due to an interaction potential U .If U is a function of distance r between 2 particles ,the law of

conservation of energy is a constant and $U = M_1 M_2 / (M_1 + M_2)$ is reduced mass . Distance R is a vector. R is constant if no external force act on the two particle system. What is the importance of this in India and Lanka. In the ancient period when there were loss of continents by continental drifts the distance between these two remained constant while the other landmasses went on drifting away , Lanka remained where it is, in a constant relation with main landmass. So the people of both the landmasses found it useful to assess any more change in sealevel, any more chance for drifting and also the force of the tsunamis coming from the now far off landmasses which were once in close proximity to India and Lanka and the method to assess any action of any external force was this constant distance. Hence the sethu was important in all these respects whether manmade or natural formation. In all other parts of world when a straight line of

megalithic stone is seen ,they try to preserve it as an ancient geometrical design made by their ancestors though they have no astronomic history to back it up with.In India surprisingly everything is politically construed as religion and not as heritage or history ,though the land is full of ancient history /prehistory of such heritage.Now to think of Newtons third law of motion , verification of Galilean invariance of N^3 , N^3 in s is N^3 in S^1 .Or action and reaction are equal and opposite in the two particles .So any disturbance in the area will have severe reactions in the other and will reflect globally.

Central forces

Gravitational force and Electromagnetic force are the central forces.Planetary motion,scattering of charged particles by nuclei are other examples.Historically it developed from the problem of calculating motion of planets around the sun and

making of horoscopes with this principle is as ancient in India as its prehistory. Right from the day of Paithamaha and Vasishta various opinions and methods of calculations occur here, while in the west it started only after Ptolemy and Kepler and became scientific only after Newton and Einstein.

- 1 The inverse problem:-Given the gathy (movement) of the particle/graham/planet can we determine the nature of the force(sakthy)
- 2. The question of Kakshya (orbit) of the planet or particle as elliptical as seen in Raasipramaana .

To get equation of orbit ,first the time is eliminated as an independent variable ,and concentrate on finding the laws of points corresponding to a prescribed relationship between radial distance from the distance the center of force and the angle through which the radial vector has turned. General

approach is to describe the motion of a particle in three dimensions ,under the action of a central force.Center of force is fixed.One body moves under its influence.In two body problem and in equivalent single body problem when one body is very massive and the other is very small compared to the massive body,the two pictures become the same.(eg:India and Lanka,Earth and moon,Sun and earth,Sun and mercury)Motion under a central force is confined to a plane.(planets around sun are planar)So that we need consider only a r dimensional [roblem .Angular momentum considered further to a one dimension.This is visualized by picturing the earths orbit round the sun ,as viewed by some observer in the plane of ecliptic ,for whom the earth would appear to move back and forwards in a straight line ,between limits given by an appropriate one-dimensional projection of two-dimensional orbit.

Definition of a central force field

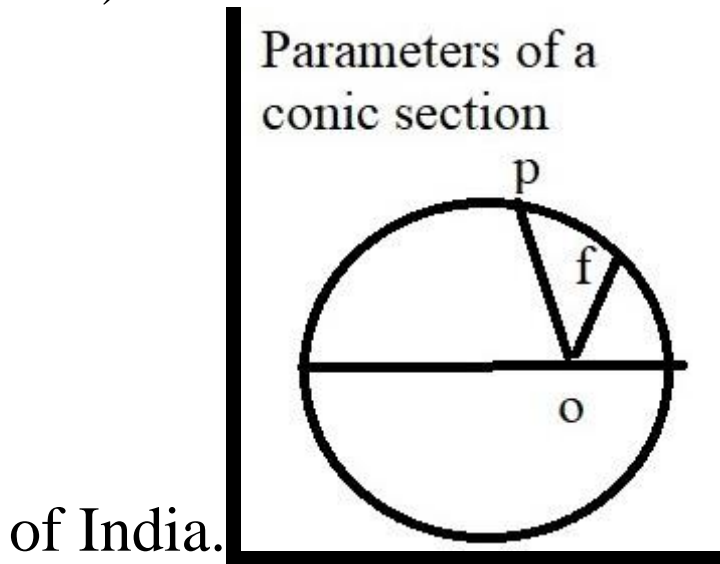
Our initial reference force is a set of fixed coordinates –the fixed stars .It is usual to work in terms of a stationary frame of reference with its origin at center of gravity of solar system.The fixed star set of coordinates and their measurements I have given in detail in tabular forms .Now,one important point is that for Lanka Mesha (Aries)zero degree or Aswathy zero degree is fixed position and for India it is Karthika (which ends at 40 degree in Taurus or Rishabha)Make $2\frac{1}{2}$ degrees on both sides (Revathy –piscium and Rohini in Taurus)to get 45 degrees which is divided as 22.5 each for the oscillation of the ecliptic .Since for central force torque is zero ,angular momentum is conserved.The same law is applicable to the graham(planets)and other binary systems,coordinates and the fixed star system clusters.Angular momentum vector is perpendicular to plane and lie along

vector. (I J K are the Cartesian fixed coordinates. Taking K as vector, and I as 3 the other two are zero (L,K). So use permutation tensor (which is kuttakam in Indian astronomy) and now it is called Levi-civita density. If the indices are anticyclic permutation of 1,2,3 it is ϵ_{123} . It is zero if any two indices are same.

Classification of orbits

1. Electrons in cyclotron have circular orbits. In kanaadaas vaiseshika anu, paramaanu have circular orbits
2. Planets (graham) have elliptical orbits
3. Comets have hyperbolic orbits

Orbits as conic sections (Inverse-square law) is shown in the texts of all astronomers



$$R = p / (1 + e \cos \theta)$$

Is the general equation for conic section. e and p are constants. p determine the size of orbit, and e its eccentricity.

$$\text{Ellipse} = e < 1, r = a(1 - e^2) / (1 + e \cos \theta)$$

$$\text{Parabola} = e = 1, r = p / (1 + \cos \theta)$$

$$\text{Hyperbola} = e > 1, r = a(e^2 - 1) / (1 + e \cos \theta)$$

Circle is a special case of ellipse where $e = 0$

Eccentricity of the orbit $e = \sqrt{1 + 2MEh^2/k^2}$ and hence the nature of the orbit depends on its energy E . as follows.

$e > 1$ implies $E > 0$ orbit is hyperbola

$e = 1$ implies $E = 0$ orbit is parabola

$e < 1$ implies $E < 0$ that of ellipse

$e = 0$ implies $E = -\frac{k^2}{2mh^2}$ orbit is circle

A particle scattering by fixed center of force at point 0.

A mass M at fixed center of force 0, force of magnitude $f = k/r^2$ where k is > 0 is repelled or scattered. Relationship of scattering angle to angular position coordinate θ . The relation of sine and cosine and the scattering angle is discussed in Indian astronomy and mathematics in detail.

The inverse problem to obtain the force or α , given the orbit is also discussed. An elliptical orbit corresponds to an inverse square law of force and orbital equation $e \cos \theta = p/r - 1$

P, e = eccentricity. If one knows these equations mathematically and applies them in astronomy, naturally it has to be

assumed that the person knows the significance of what he is saying or doing. So, it goes without saying that Indian astronomers knew these laws and also the eccentricity and elliptical nature of orbits and without that they could not have thought about *ayanamsa* and precision of equinox. (Now differentiate the orbital equation on both sides with respect to time. and $e \cos \theta$ substituted back to orbital equations .)

In 1609 only we got the first two laws of Kepler and in 1619 only the third law of Kepler came out. Till that time what the western world knew of astronomy and ,and what India knew of astronomy is being compared here .In Kepler's law 1 ,planets describe ellipses with sun as one focus (the law of force is the attractive inverse square law).In Kepler's law 2 radius vector drawn from sun to a planet sweeps out equal areas in equal times. Constancy of angular momentum as a consequence of restriction to

central force .In mathematical form the second law is stated as $r^2 \frac{d\theta}{dt} = h$
 h =angular momentum per unit mass and is constant

h =twice the areal velocity of orbital motion

Third law of Kepler squares of the periods of different planets are proportional to cubes of their respective mean distances from the sun.Periodic time T =time taken for planet to complete one orbit.Mean distance from the sun(madhyamikagathy of Indian astronomers)=semimajor axis of the ellipse.Also shown from the inverse square law.This influenced Newton to develop classical mechanics .And when we see the same in Indian astronomy,why not accept the fact that the laws were known to them before ever the western world had any idea about it?The mathematical and astronomical history of India to be understood fully,you have to read the texts in Sanskrit ,just as we have to read English to know the modern

theories. Here the language limits our knowledge, as well as it expands it. Mechanical vibrations and waves This is a very important application of Newton's law of motion. And Doppler effect which is inherent in special theory of relativity. The wave mechanics was described in Naadbrahma concept and practiced in Nadayoga in Indian classical music which is part of Astronomy which I have discussed in my book on Music therapy and Classical musical traditions of India, Raagachikitsa. Small displacements from stable equilibrium and simple harmonic motion (SHM) from Newton's law 2. SHO is the principle behind a simple pendulum, vibrating atom in crystal lattice, and high energy particle physics. Pendulum is a mass M suspended by a string of length L from a pivot. Gravity provides restoring force both along the string (called *sulba/ thanthri / soothra/ rajju* in Sanskrit) and at right angle to it resulting in force balance

(saamarasya) Since a springmass system depend on particles mass (and hence weight) it naturally depends on earth's attraction (guruthwa) Two masses on a stretched string therefore balances. The Balance used by people of India, who were very particular about weight and measures even during the IVC period came from this knowledge. The concept of SHM study periodic motion localized at a point in space. Now to that which travels through space or SHM in a moving reference frame. Wavelengths are determined by the traveled distance of a wave or of sound wave during a period t . There are waves of two kinds.

- 1. Longitudinal waves displaced in direction of the travel of the wave
 - 2. Transverse wave displaced perpendicular to direction of travel.
- Sound waves are compressional waves in solids and liquids and are examples of longitudinal waves. Electromagnetic

waves (light, radiowaves) vibrations of a stretched string (rajju/thanthri/sulba) as in musical instruments are examples of transverse waves. String supported (stretched) between 2 points displace it slightly. Tension t is the displaced part of the string oscillator. It travels along string as wave. Speed of it depend on mass of string (mass per unit length of string or linear density ρ) and on how tightly it is stretched. (tension t) This oscillation being a transverse wave is comparable to electromagnetic wave, to light and radio waves and therefore the experiments with sulba or rajju were for this type of wave force. A small transverse disturbance move from left to right, what is its speed U ?

Transform the reference frame of moving wave. Then it appear to move from right to left with speed $-U$. In one string stationary and wave moving, and the other wave stationary and string moving the direction of

travel is changed. 2 identical traveling waves in opposite directions =equivalent to a standing wave. A stretched string is an example for that. Here a trigonometric identity of sin and cos are used (Trikonamithy in Indian way) The first 3 modes of transverse vibration of a stretched string

First harmonic wavelength $2L$

Second L

Third wavelength $2L/3$

Antinodes are points of maximum amplitude of oscillation where $\sin kx = 1$

Or $kx = \pi/2, 3\pi/2, 5\pi/2, \dots$ and nodes are points of zero amplitude of oscillation or $\sin kx = 0$

$Kx = \pi, 2\pi, 3\pi, \dots$

These are infinite series of such modes with increasing number of nodes and antinodes in each.

Acoustics in moving reference frame is classical. Doppler effect is a matter of Galilean relativity

- 1.Experienced in everyday life.eg siren of vehicle change note as it pass by.As it approach pitch is high.Sankara in Chadyogya commentary dealt with it and of quantum chromodynamics.
- 2.The speed of sound is small when compared to light .So it is a matter of Galilean relativity.

The difference of sound from a stationary source and moving listener,and sound from a moving source and stationary listener is explained in ancient texts like Varahamihira ,in thanthric and upanishadic texts.When listener is at rest the moving source of sound emits two waves in time $t, 1/f$ apart .But this assumption of universality of time in Galilean relativity is not valid in special relativity.The 2 effects become identical when the speed of source and listener are small compared to speed of sound.

When we take a system of N particles (not 2 particles but infinite number of particles) or 9 coordinates or N coordinates the total kinetic energy and potential energy of the system (solar system if 9, and cosmos if infinite) of one universe or of multiverses is derived.

The solid body motion is around a fixed axis (rotation) about a fixed point.

Noninertial frames of references are coordinate systems moving with constant linear acceleration. And Electromagnetic waves (Maxwell's equation) are not Galilean movements. Michelson-Morley experiments implied velocity of light in vacuum is inadequate of the frames of reference which violate the Galilean law of addition of velocities. Lorentz transformation introduced as modified Galilean transformation to make Maxwell's equation the same in S and S' . Einstein united both the ideas in his

special theory of relativity with just 2 axioms to choose from .He had

- 1.The correction of Newtons laws and Galilean transformation on one hand
- 2 And the correctness of Maxwell equation and Lawrence invariance on the other.

His axioms were

- 1. Laws of physics are same in all inertial reference frames.
- 2.Velocity of light in vaccuo©is same in all inertial frames.
- 3.And a corollary of these two axioms
”No physical experiment can be used to tell whether an inertial frame is moving or at rest (with respect to any other frame).

These are the basis of special theory of relativity. If we accept them we also accept that

- 1.Time is not universal
- 2.simultaneity is relative

- 3. Time is dilated .Moving clocks run slow
- .4.Length is contracted.Moving body contracts in direction of motion
- 5.Mass and energy are equivalent.

Thus came the paradox of twins ,of apparent contradictions,and the resolution of these paradoxes.

Relativistic kinematics.

The stellar aberrations or change in the incident angle of light from a star is due to earth's motion (and along with that change in position of observer on earth)as rightly assessed by all astronomers before and after Panchasidhanthika of Varahamihira in India.Stellar aberration is a classical effect. Special relativity only provides a correction to the classical result.

- 1 Even before special relativity there was a basis for measurement of speed of light ,the angle of aberration being

measured. V as velocity of earth to its orbit ,and with these two,one can measure speed of light as demonstrated by Varahamihira,Parameswara and other astronomers .

- 2. When considering aberration, we are dealing with apparent change in angular position of a point source due to the relative motion of the observer.

But if we consider an extended source ,say a moving body ,each point of the body act as a point source .But the amount of aberration will not be equal for all the points. That is, a fast moving body (in observers point of reference ,the earth) may change its appearance. We can measure Lorentz-Fitzgerald contraction but cannot see it (Penrose –Terrell notation). What we can measure ,but cannot see with physical eye is the jyamithy of Indian astronomers and it is equivalent to Sakthy concept of the Thantra. The frequency shift in radiation due to relative motion of the source and of the

observer leads to the thermal as well as transverse Doppler effects .The dwani and varna shifting is given in detail in chandogya Upanishad bhasya of sankaracharya in 8th century.

Euclidean space of threedimensions and Minskowsky space of 4 dimensions and the nature of lightcone in spacetime geometry is seen in the mathematics of ancient India.The timelike and null geodesics ,a spherical triangle formed by two lines of longitude and the equator demonstrates this at Lanka/ India and Indian ocean area.In Galilean relativity ,trajectory of a free particle is straight line ,along with the particle masses with constant velocity.In special relativity ,the particle has a worldline (straight) in Minskowsky space.In a curved spacetime the straight line is no longer the shortest distance between two points .It is a geodesic curve.(Karna/kalaakarna in astronomy)

The great circle routes of present day ships and aircrafts therefore move on a surface of

a sphere.(So was for the ancient seafarers of India,especially the southern west coast people who were also adepts in astronomy). A map or a chart is only a projection of the surface of a sphere onto a plane for them, and they never thought that earth is a plane surface like a map,as Miletus of Thales did, and yet is credited with the prediction of a solar eclipse which is impossible for one who thinks earth is like a mat!!1The map/projection on a plane surface is meant for short journeys where curvature of earth can be neglected.

If we want to determine whether a surface is flat or not (vasthupurusha)we can use Euclidean geometry that the angles of a triangle add upto 180 degree.But on the surface of earth taking the 2 lines of longitude and equator ,the series of longitudes meet the equator at 90 degree so the sum of base angles is already 180,the angle of polar vertex still has to be added and it could take any value upto 360.A

positive curvature. If less than 180 degrees, a negative curvature. The radius of curvature, the equation of tangent vector at the point etc is just like a sphere. In Euclidean geometry parallel lines never meet. But on globe the longitudes meet at the pole (they are parallel only at equator). So for small local areas and for entire globe we have to use two types of logic and mathematics and this was known to Indians from ancient times, but to the west only very late, with postNewtonian, Einsteinian era.

Referring to tangent vector T , Minkowsky 4 space has geodesics classified as

- 1. Timelike.
- 2. Null and
- 3. spacelike

If tangent vector is zero, timelike and correspond to trajectory of full particle in 3-space

If $T > 0$ it is nulllike and make up the surface of a lightcone. And are worldlines for rays of light.

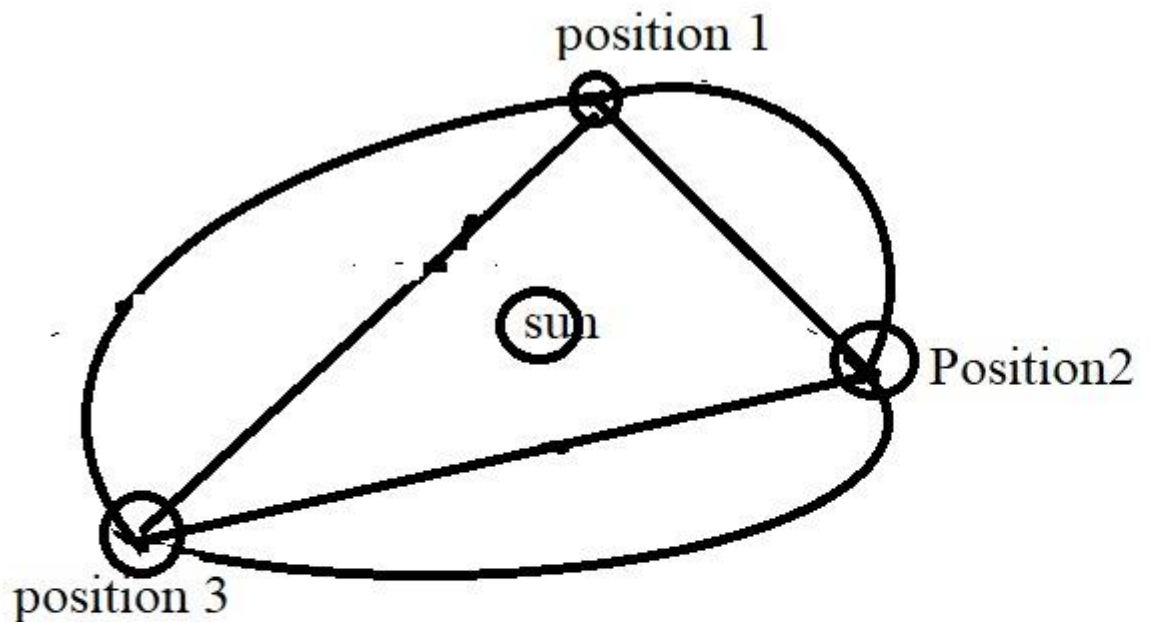
If $T < 0$, spacelike and has only technical significance. They lie outside lightcone, and cannot be worldlines for any type of particle and therefore are unphysical. The geodesic curve cannot change type. That means, if it is timelike in one point it remains timelike at all points.

- Postulate 1. Spacetime continuum is represented by 4-dimensional vectorspace with flat metric
- 2. In this vector space free particles traced along timelike geodesics while light rays travel along null geodesics. This is equivalent to second axiom that the speed of light is same for all inertial observers. Postulate one points in direction of general relativity, when we consider the case where metric is not flat but curved.

Einstein and the electromagnetic field experiment

Time taken for light to reach a series of translucent screens increase in arithmetic progression. 1, 2, 3, 4, Whereas vertical displacement of screen due to acceleration will be in geometric progression. 1, 4, 9, The light spots on screen lie on a parabola just like trajectory of a projectile in a uniform gravitational field. Hence principle of equivariance is to apply to electromagnetic field, it follows that a ray should be bent by a gravitational field. This seemed a surprising conclusion to scientists, because in terrestrial classical physics a light ray is seen as a straight line. Calculations show effect of gravity on light ray would be too small, to the observer under normal terrestrial conditions and one has to look for astronomical effect when light from a distant star would be deflected by gravitational field of sun. In order to observe such a deflection it is necessary to watch an eclipse of the sun. The 1919 British astronomical expedition to Africa was just

for observing such an eclipse and to verify Einstein's quantitative prediction of the amount by which light rays were deflected. At astronomical scales the planets provide a choice for distant objects with which to define a triangle. Triangulation of space in solar system



At one corner of the triangle is earth and two other planets on the other two corners.(In sreeyanthra in this way 43 triangles with 129 celestial objects are studied.The yavadhanya and machayanthra of Indian astronomers were measuring these.The light rays take the shortest distance along the geodesic of the curved 3D space.In curved 4Dspace their world lines are null geodesics ,in accordance with the principle of special relativity .In this context Euclidean straight lines have no meaning.The triangle in a rotating chakra (sreechakra or sudarsanachakra) or a turntable show the ray of light bent away from center(opposite in the case of light ray by gravitational field of sun).In a non-Euclidean space in the rotating frame come from measurement of π from the circular chakra.When it is rotating ,the observer on the turntable find his measuring rod differeing from the maximum contraction as he measures the circumference and unaffected (regarding length)when he

measures diameter. So diameter has the same number of units as the observer on S, but circumference has greater number of units and the ratio of circumference to diameter of circle or π is larger than in S in the case of the cosmic kaalachakra. This is what an Indian astronomer measures with the geocentric position as his measuring rod.

The classic summary of general relativity

Matter tells space how to curve, space tells matter how to move. The predictions of general theory of relativity are

- 1. Tests of gravitation of relativity are tests of general postulates embodied in the principle of equivalence, experimental confirmation of bending of lightbeam in gravitational field.
- 2. Precision of planetary orbits. Planets in general relativity move along a timelike geodesic. In the solar system the effect is more with Mercury. So the laws more

Mercury are different from other planets .The “Advance of perihelion of Mercury “lacked an explanation and was a long standing puzzle for western astronomers. But we find the laws of Mercury as different discussed by various astronomers of the 5 sidhanthas and explained by Varahamihira as early as 5th century AD and described by the commentator sudhakaradwivedi (when Einstein was a boy of 10) and the English commentator Thibaut commenting that he cannot understand the special laws of Mercury in the text. The very fact that the laws of Mercury were known to Varahamihira and astronomers before him should be understood in the proper perspective. Unless one know the general and special theories of relativity one cannot understand the laws of Mercury and predict its position and its eclipse.

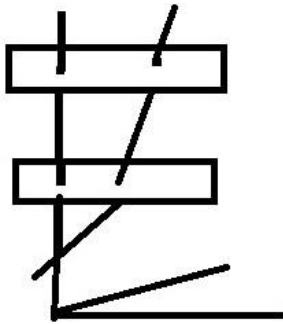
- 3.Gravitational red shift

- 4. concept of blackhole a singularity in spacetime and all the photons attracted to this singularity. This is described in the Gargabhagavatha and in the pralaya concept.

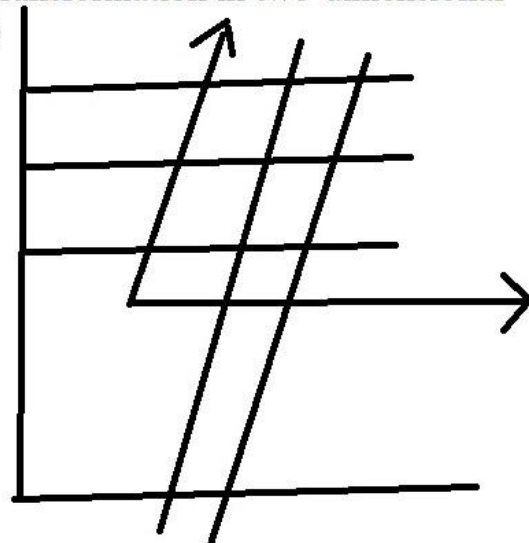
In special relativity by N.M.J Woodhouse (springer verlag series 2003 ed) the two properties of space are that it is homogenous (there is no preferred place) and is isotropic (no preferred direction) Therefore laws of mechanics take same form wherever you are ,in whatever direction you look. Or space has rotational and translational symmetry.

Relativity teach us that the motion of the frame is the freedom of choice of the frame. Rotation of earth ignored in clock ,in pendulum, the lab experiments of small scale. But not in large scale observations like behaviour of weather ,anticlockwise air circulations ,in a region of low pressure or in predicting an eclipse or a trajectory of a comet. This is the importance of a text like Panchasidhanthika (and its predecessor texts

) as well as Brihatvaaraahisamhitha by the same author. All these are discussed in detail by Indian astronomers in most scientific way showing their awareness of both the laws of general and special relativity. Newton actually had 6 laws (In his philosophiæ naturalis principia mathematica) The 4th law was the principle of relativity which he didn't understand well, since his prediction of Mercury's position was not correct. Spacetime in Galilean relativity (one dimensional) and in 2-dimensional spacetime



Galilean transformation in two-dimensional spacetime



L is straight line History of a particle moving in straight line ,at constant speed (the slope is great and speed less)is seen in Galilean relativity.In 2 D spacetime constants t and t_1 coincide reflecting the invariance of simultaneity.In relativity no absolute standard of rest ,only relative motion is observable.

18th century history of Electromagnetism
In Greek magnetism is derived from the stone from Magnesia.Static electricity was made by rubbing amber with fur.Greek word for amber was the word for electricity.Light was galvanism or animal electricity (Luigi Galvani)discovery of electricity in animal/human body.In 1822 Ampere suggested light is wave motion in luminiferous ether which was described in Indian scriptures as Vidyuth in the sky . We must remember that Galileos book describing scientific facts was discovered from the index of prohibited books in western world,while in India the

science works were never prohibited but studied by all .In 1831 Faraday found a moving magnet generates a current.In 1846 he found out light is a vibration in magnetic line of force.In 1863 Maxwell equation for dynamics of electrical and magnetic fields.In 1905 Einsteins electrodynamics of moving bodies came.

We must understand how science is built up from observer to observer over the years whether in modern or ancient times,and how the modern astronomy has developed from ancient astronomy first.Then we should be broadminded enough to feel that science whether ancient or modern,whether English, Greek, Latin or Sanskrit is science and any person in any part of the world can think and understand science in his/her own language, and still be a scientist.If we understand these the modern Indian scientists and leftist historians view that everything that is Indian and in Sanskrit language is myth and

everything that is in English is science can be a myth too. Everything that is written in Sanskrit is not gospel truth as some rightist thinkers believe, just as everything that is written in English language also cannot be gospel truth. We have to cross over barriers of language, caste, creed, religions, leftist and rightist political leanings to understand that human civilization is a continuous process and all of us are genetic and cultural heirs of it and that it started its evolution in Asia and spread to Europe and Indian astronomy, because of Indian subcontinent's strategic position in the path of the monsoon winds had played an important role in human civilization and its growth. The history of the ocean routes and the history of the Indian ocean will give us the history of whole human race and its intellectual development.

Spacetime and its cognition in the epic Bhaagavathapuraana of Vedvyaas.

Vedvyas was the son of sage Parasaara ,a vedic astronomer and the daughter of a daasa(fishermen community)who go to sea.Hence he was genetically a Brahmin as well as a karnadhaara /fisherman /daasa.It is this great sage who classified and codified the 4 vedaas in India in the third cyclical yuga ,in the beginning of the third yuga,in the saraswathi land.He taught each veda to a separate disciple –Rik to Paila,saama to jaimini,yajus to vaisampaayana,atharva to sumanthu and the 5th veda was taught to Romaharshana (disciple)as well as to Suka (son)and this 5th veda we got from Suka and Sootha,son of Romaharshana ,as Bhaagavathapuraanam.There are 4 instances of Bhagavathapuraana being taught after BC3104,the departure of Krishna from the earth.

Aakrishnanirgamaal

thrimsadvarshaadikagathe kalou

*Navameetho nabhasye cha kathaarambham
suke karothe*

Means aftr krishna's exit ,30 years after
Suka taught it to Pareekshith in month of
Kanni,on a suklanavami day in the shore of
Ganga.

*Pareekshith sravananthe cha kalou
varshasathadwaye*

*Sudhe suchou navamyaam cha
dhenujokathayath kathaam*

200 years after Pareekshit,on a suklanavami
,in month of karkitaka/cancer ,Gokarna
recited it for the sake of prethamukthy of his
brother.

*Tasmaad api kalou prapthe thrimsad
varshagathe sathy*

*Oochuroorje sithe pakshe navamyaam
brahmana:sutha*

Therefore(since on both occasions ,the
recital happened on white navami day) the
sons of Brahma recite it on suklanavamy

day regularly starting from Karkitaka to kanni (chathurmasya) for their pithrusradha as ancestral worship. And after Gokarna , even mlecha and common masses started with panchamaveda because Brighu ,the sage called everyone so that they can be benefited by the knowledge of Godhead with this.In Naimisaranya Sootha ,son of Romaharshana thus taught it for everyone after 30 years .

Vyaasa to Suka and Romaharshana before Krishna's death had taught the panchamaveda. They were contemporaries of Vyasa's other three sons Dritharashtra, Pandu and Vidura.

BC 3104 death of Krishna on a Friday evening. Krishna was contemporary of Vyasas grandchildren Pandava and Kourava. Son of Romaharshana, Sootha was also a contemporary of these people.

BC 3074 Suka to Pareekshith

BC3004 The Son/s of Brahma

BC 2874 Gokarna at Gokarna ,in the northern border of present Kerala.

Time	Space/direction	Sage /listener			
1. Before 3104 BC	Saraswathy Theera (Between Saraswathy /Drishadvathy rivers (Central and west India)	Vyasa /Romaharshana	Contemporary of the 4 vedic disciples of Vyasa and of suka ,and his other sons.	Geneologically he is the father of the sootha dynasty also called Maagadha/Vai thaalika in Katha/ Harikatha traditio	

2.B C 307 4	Northern Bank of Ganga .Kanni suklapaksha navami /Mahanava mi day	Suk a,so n of Vya sa /Par eeks hith gran dson of Arju na	It was year of death of King Pareksh ith.Pare ekshith was great grandso n of Vyasa and suka was son of Vyasa.T	ns of India.T o which Sanjaya ,Athira dha,Kar na also belong. Krishna also had taken up positio n of sootha of Arjuna ,and hence being called soothap
3.B C 300 4.(1 00 yrs				

from death of Krishna) From that day Navami is the beginning of Katha.	Haridwar /Northern origin of river.Ganga /Dakshinaayan/karkitakam suklanavam i (as ancestral worship of Pandavaas who left from Haridwar to Heavenly journey//Mahaprasantha	Brahmanasutha were reciters /listeners	herfore ,suka is actually the grandfatherly figure for Pareekshith The interpretation of Brahmanasutha as sanaka/Naarada/saptharshi exists.But it	uthra was after all not an insult. 30 yrs from the death of Krishna ,the teaching of Krishna and of Vyasa is given to the next generation
--	---	--	--	--

4.30 34 BC Alm ost the sam e time	Naimisaran ya /Maghada/	Soot ha son of Rom ahar shan a to Sou naka	may be just the sons of Brahma gna/or sootha of Brahma gna	ion of Indians. The sanaka- Naarad a- Upaslo ka(son of Krishna)and the Krishna - Udhava schools are in Haridw ar.And this chathur masya
---	-------------------------------	---	--	---

5.B C 287 4.A fter 200 yrs of Kris hna s deat h.	Gokarna in Kerala/Kar nataka /old Mooshakar ajya.	Gok arna /His brot her as a ghos t/an d all peop le incl udin g mlec ha who were brou ght ther e by Brig	The ancestor s of Maghad a at Karnapr ayag also has the same custom as the central Rajgrih of Magadh a	traditio n of reciting ancestr al history from navami to navami (Cancer - Virgo)a nd then observi ng the shadase ethimu kha or ancestr al bali is all
--	--	--	--	--

		hum uni	The ancestra l prethmu kthy/rit es for moksha of departe d souls became very popular	over India. Varaha mihira say hearing this samvad a in sounak as yagnas aala,the yavana guru of Romak apura learned Romak asidhan tha,the lunisola r yuga	
--	--	------------	--	---	--

				<p>calculat ion.</p> <p>This Romak asidhan tha is not that of Rome but of Meluhh a country (Mlech a)whic h is in Sindhu desa accordi ng to archeol ogical</p>	
--	--	--	--	---	--

				evidences and literary sources of trade of Indus valley and Harappan people	
--	--	--	--	---	--

These are thus the 4/5 recitals mentioned in Bhaagavathapuraana and the time calculation of these historical events are in conformity with IVC/Harappan period and the new compilation of vedic knowledge by Vyasa..Being a Mahaapuraana Bhaagavatha has 10 lakshanaas which include sarga, visarga sthaana,manuanthara ,eesakatha etc.Sarga is how prapancha was created by

gunakshobha from Brahma/Prakrithy and therefore is the discipline of samkhya of kapila and Paramaanusidhantha of Kanaada combined. It is part of sabdasasthra and creation of sabdabrahma . Visarga is brahma's creation. Eesakatha is the stories of great personalities or avatharapurusha. And manuanthara and description of kaala is the history of the entire world .

Sarganiroopana and kaalaswaroopa of Bhagwan Hari is as follows. The leelaswaroopa of Hari assumes different forms before and after pralaya. These are the two avasthaas . There are 9 srishti which are grouped as praakrith and vaikrith. 6 are praakrith srishty and 3 are vaikrithsrishty. Vaikrith are Manusrishty. There is an ubhayasrishty (combination of prakrith and vaikrith) and this is the 10th srishty called kumaarasrishty. There are 3 types of pralaya called kaalakrith, dravyakrith and gunamoola. These are nitya, naimithika and prakrithylaya.

The first 6 srishty are described in the samkhya chapter in detail. The 7th is the plantlife/oushadi/vanspathy.

8th is tiryagloka of animal life which is of 28 types depending on their hoofs, nails, travel in water, sky etc. 9th is manushyasrishty and 7, 8, 9 are called vaikrithasrishty. The difference from 7 and 8th is that it has a digestive system that propels food downwards due to an upright position, says Vyaasa. In the kaalaswaroop of Bhagvan, the athisookshma paramaanu join to form a saamanya (general) and a visesha (specific) form of the prapancha. These are the sookshma and sthoolaprapancha. The root or moola of the dravyaprapancha (material world of objects) and of kaalaprapancha (the subtle world of time) is the paramaanu according to Bhagavatha. The paramaanudravya (matter as units of paramaanu) are called kalaakathama (the modern equivalent of quanta). The kaalaparamaanu is defined by vyaasa as the

time required by a lightray to fall upon a smallest unit of dravyaparamaanu /matter. Therefore kaalaparamaanu is a timeunit. The sunray is made up of several kaalaparamaanu and a kaalaparamaanu is the dravyaparammanu multiplied by its movement or gathi square. If we translate this into English we get Einsteins famous eqation of energy. The time taken for a lightray to spread all over brahmanda is called the Mahadkaala or simply mahad .

The Time /Kaalaparamaanu /Mahadkaala and its units of measurement is as follows.
 2 paramaanu=1 anu (invisible/therefore immeasurable with gross senses) belong to the ultraviolet/infrared spectrum of energy
 3 paramaanu=1 thrasarenu (visible as moving in a ray of light that fall through a slit) Belong to the spectrum of VIBGYOR.
 3 thrasarenu=1 thruti
 100thruti=1 vedham
 3 vedham=1 lavam

3 lavam=1 nimisham
 3 nimisham=1 kshanam
 5 kshanam=1 kashta
 15 kashta=1 laghu
 15 laghu=1 naazhika
 2 naazhika=1 muhoortha
 6-7 naazhika=1 yaamam /praharam
 4 yaama=1 ahas/1 night
 15 aharnisha=1 paksha
 2 paksha=1 maasa
 2 maasa=1 rithu
 6 maasa=1 ayanam
 12 maasa=1 samvatsaram
 2 ayana=1 devadinam
 100 samvatsaram=1 manushyaayus

Measurement of Naazhika by a jalaghatee
 yanthra/waterclock employs the floatation
 technique/and the sinking of a vessel/ship in
 water and this is what we call Archemedes
 principle today. Method of making the
 waterclock is described as follows in
 bhaagavatha. Make a vessel which can hold

1/12 of water of a Para .(This is called an Idanghazhi)The vessel is made of 16 palam chempu /thamra or copper.A needle or salaaka made of one panam gold/suvarnam is used to make a small hole in the bottom of the vessel so that if floated in water the vessel sinks in exactly one naazhika,which is the time taken to fill the vessel with water through the hole.The principle of ship making, sinking a ship,the principle of mettullurgy ,of measurements ,of weights was known to Indians and Dwaraka as a portcity was controlling Indian trade and commerce in early Harappan period and the words of Vyasa and the archeological evidences of Indian trade overseas conform to logical interpretations.

Did the bhaagavatha aware of the global shape of earth and of the weight of the earth? Vyasa says the earth was pulling down due to its weight(bhaaravathee bhoomi) and that she is a gola or spherical (Maheegola)just as any astronomical texts of

ancient India does.(Kardama the sage traveling with his wife in a vimaana or aeroplane watches the earth as a gola .Prekshayitwaa bhuvo golam.From an ordinary aeroplane we cannot see this,but from a spaceship we can see earth as a gola .Then did Kardama travel in a spaceship?) Indians used different samvatsara due to the change in the difference of planetary movement (grahabhedagathy)and there are 5 types(samvatsara,parivlsara,valsara,idavalsara,anuvalsara)and these panchavarsheeya paithamahayuga is followed right from paithamaha,gargya,prasara,vyasa ,and the other astronomers of India.

The paramaanu or quantum time is the unseen ,immeasurable time which is subtle and the Trasarenu is the quantum chromodynamic wave mechanics of the visible spectrum or its varna.The tiniest measureable time unit of a human being is a truti ,and the biggest mmeasureable time unit of human being is a kalpa.That is Indians

had the concept of time as the most subtle and the most gross and the measuring units of them. They had the chathuryuga with its sandhya /intercalary periods and for them 14 Manu ruled for more than 71 chathuryuga and this is the 72nd chathuryuga period. One Manuanthra is 214000 years and for 14 Manu it is 2996000 years. 1000 chathuryuga is 12000000(1 crore 20 lakhs) yrs and that is one day of Brahma. The aayus of a Brahma is 2 parardha which is 10 to the power of 13.(1000000000000000) and 2 parardha is twice that figure. The first parardha of the first kalpa was called Brahmakalpa and during that the paramaanu and the sabdabrahma were created. The second kalpa of the first parardha was padmakalpa and during this time the prapancha was created as the padma(lotus) in the naabhi of Vishnu and Brahma the creator was born in it. The universe was created in this kalpa. Now ,we are in the second parardha of the aayus (lifespan)of Brahma. The first half of

the second parardha was named varahakalpa when the bhaaravathy bhoomi was going down due to her guruthwa and the Aadidaitya / first human race was born. It was during this stage that the varaaha took bhoomi on his horns and kept her in her present orbital position(sthaana).

What was the state of the earth and the prapancha during the birth of the adidaytya ? There were the three types of ulpaatha (divi,bhuvi and anthareeksha)the earth and the mountains were constanly having quakes and fire was emitted out of mountains(and lava coming out with great fragments of rocks)ulkaas were everywhere,several dhoomakethu(comets)seen,great winds blew with sounds and hurricanes traveled and everywhere there was dust and the winds were rajodwaja(with flags of dust)and stars and moon and sun became invisible due to it,darkness prevailed and trees uprooted even without wind,the oceans and rivers were reddish and big waves were rising,fires

were seen even on the watersurfaces due to the fireemitting mountains underneath oceans,eclipses happened continuously , parivesha(halo)around sun and moon , thunderous noises and also the movement of a ratha(cart)within caves of mountains were heard,animals like jackals,dogs,wolfs,owls and donkeys (during the tsunami of 1964 in Rameswaram /Dhanushkoti ,I had witnessed a donkey breying and running in fear before the huge waves swell.)made cries and ran afraid of something ominous,birds fluttered in fear,cows had blood instead of milk in their udders,there were red rains and rains of excreta ,idols were sweating ,there were grahayudha and moudya of graham,the earth was sinking in the ocean and it was the mahaapralayakaala .The entire 10 directions were having digdaaha and were burning and hot(disā sarvāa projwalu).The Mahi with the sapthadweepa was trembling and submerging in the pralaya waters.When this happened ,according to bhaagavatha,the

earth has already been having saptadweepa and therefore ,this pralaya is the pralaya after the splitting of Gondwanaland into 7 continents and the adidaitya were the early human beings of this period.

The andakosavisthrithy(the diameter of the brahmanda)is 50 crores yojana with 7 coverings (each 10 times bigger than the inner one) the innermost being earth from which the observer(scientist/sage)looks at it. There are several such brahmanda,not just one (not a universe but a multiverse)and the entire structure is just a paramaanu in the Mahad aksharabrahma called Haridhama , dissolved in it. The concept of such a multiverse was not digested by the early Roman/Greek/European scientists because they were not aware of such most subtle and most gross multiverses or of its time measures. Therefore the concept of Goloka of Gargya,simsumaara of vedic and bhaagavatha people,the brahmaandaas of vasishta etc were considered just mythical

imaginations of Indian mind. But now, in the modern astronomy we find the same concepts in a scientific way. But, the preconditioned minds still think the ancestral mind as unscientific and the modern mind as scientific. The difference is only in language. Now we use English and mathematics and then we used Sanskrit and mathematics.

Sudarsanachakra as kaalachakra of Hari

Trayodasaaram trisatham shashtiparva
Shannemyananthachadiyaththrinaabhi
Karaalasrotho jagadhaachidyathaavath
 says Vyasa and this description echoes that of the vedic kaalachakra. 13 spokes, 360 parva or degrees, 6 nemi as rithu, 3 naabhi of the 3 segments of 40 degree each, innumerable endless chada or ksjhanaas, and beautiful to look at for those who love and know it, but fearful and avoided by those who detest/hate it and are ignorant of it, is

the chakra of Vishnu which protects the dharma and this dharmachakra is also seen in Budha's preachings and on the Asoka sthambha of King Asoka in BC 300, and on Indias emblem of the present day. For an Indian astronomer and for Vyasa, bhooloka is the dwelling place of humans, Somaloka is that of the ancestors who has departed, and sooryaloka is that of ancestors who had reached the sun and of devaas. Beyond all is the Goloka where Vishnu/Krishna dwell.

*Yathra somasya sooryasya sidhaantham na
gathy :kathaa*

*Tham lokam hi gathaa sthe thu
sreemadbhaagavathasravaath*

Somasidhantha is the theory of moon, sooryasidhantha is the theory of sun, and Golokasidhantha is the theory of the stars beyond the solar system. In the 30th chapter sage Kapila says

*Yojanaanaam sahasraani
Navathim navachaadhuanaa
Thribhirmuhoorthairdwabhyaam vaaneetha:
Praapnothi yaathananaa*

The departed soul which reaches the pithruloka of th moon,has to travel 99000 yojana in 2 to 3 muhoortha at a very great speed (and this great speed is required for a rocket in modern times to traverse great distances and reach the moon or other planets so that the earths pull of gravitation is overcome) and has to come back to earth after enjoying the fruits of karma there.The pithruloka of moon is considered as a yaathanaaloka where both pain and pleasure are there just like the earth .

When Gokarna was debating with the learned brahmavaadins about the prethamukhthi of departed soul, everyone assembled there heard a sooryavaakya (refer to the chandravaakya) which said

*Thatha:sarvair sooryavaakyam
 thanmukthou sthaapitham param
 Gokarnaasthambhanam chakre
 sooryavegasyavai thathaa
 Thubhyam namo jagathsaakshin broohime
 mukthihethukam
 Thal sruthwaa
 dooratha:soorya:sphutamithyabhyabhaasha
 tha.*

The chakra of the sun was stopped from its
 vega or gathivega(speed)and the suns path
 which is far off and the sooryasphuta was
 made clear to the sage and the way of
 sooryaloka (utharaayanagathy)was revealed
 to him through soorya's grace.He knew how
 to do within 7 days ,to go beyond the 7
 granthi of his body(7 chakra in human body)
 as well as in the solar system(the 7 planets
 as 7 chakra)in the dwadasaskanda (12 parts)
 raasichakra ,12 sruthy sabdachakra with 7
 swara,12 skanda varnachakra with 7 colours
 and so on.The 7 planetary chakra in solar
 orb from beyond are sani (Saturn) venus

(sukra)Jupiter(vyazha)and budha (mercury) mars(chovva)and moon (closest to the observer on earth as an object that is within the earths sphere of attraction)and this law of the solar system and the calculation of sooryasphuta in astronomy are mentioned in this way .Goloka is beyond the solar system and the fixed star system and it is described by Gargyasamhitha (Gargyabhaagavatha.) The nimitha observed during adidaitya origin is already mentioned and it is the time of formation of earth or a yugapralaya.The nimitha of a minor pralaya are also described in bhaagavatha when yudhishtira speaks of them at the time of a pralaya that engulfed Dwaraka ,the port city of Krishna.

Ch 14 sloka 10-21 describes these.

Sloka 10 Utpaatha of three types
divya,bhouma and anthareeksha

Sloka 11. the left side of his body has been
having muscle twitches

Sloka 15.The horizon all side become smoky and dhoomra in colour,The earth and the mountains have quakes,Nirghaatha happen without any clouds

Sloka 16.Winds are harsh ,and brings dusts and there is darkness around ,clouds rain dirt and blood

Sloka 17.Sun has lost brightness and there is grahamardha ,heavens are dark and the living beings experience heat and cry of the suns heat(Though the sun is not bright,he is very hot)

Sloka 18.Lakes and rivers are cloudy and with huge waves and burn as if with the kaalaagni of pralaya.

These are almost the same as in the Aadidyatya's birth during the first yugapralaya,but the pralaya is apparently only in one part of earth according to Vyasa ,but from the world's history we find there had been pralaya in other parts of the earth as well,but the earth had survived it.The same happened even before the tsunami of

2004 and one has to think retrospectively to assess the value of such nimitha. The red rains reported from kerala ,the behaviour of animals and of lakes and wells etc in kerala during that period show the value of the nimitha in predicting a tsunami and the Brihatvaaraaheesamhitha actually predicts the pralaya in certain localities based on such meteriological observations(described elsewhere in this book).

Another question is whether vyasa knew of nuclear weapons? When both Arjuna and Aswathamaa sent Brahmaasthra against each other it was like sun and fire conjoited and the earth and sky became invisible in the brightness and there was heat similar to the agni of the kalpakaala pralaya. Vyasa was alive in the dwapara just before kaliyuga started but he was not the one who first crodified the veda.the veda were first seen and heard by Purooravas in the beginning of Threthayuga and seeing the chronology of the suns and moons race(that of Rama and

Krishna)he was very very ancient and vyasa had only reinvented veda and vedic knowledge in early Harappan/early preharappan period.

When we speak of Dwaraka and Krishna the youngsters may ask a few questions .We have to answer them .One young doctor in the orkut Indian history community had raised some questions which I try to answer here.

- 1.Was there a Dwaraka at all?
- 2.Was there a historical Krishna at all?
- 3.Even if there was a historical city of Dwaraka was it that of Krishna ?

Taking the possibilities of having all questions answered in the affirmative and all questions answered in the negative and some questions in affirmative and negative we have the following 6 major possibilities .

Q number	A	B	C	D	E	F
1	Y	N	Y	N	N	Y
2	Y	N	N	Y	N	Y

3	Y	N	N	Y	Y	N
	100 %	100%				

Y stands for yes or asthi, and N stands for no or naasthi. A 100 % asthi (totally rightwing view) and a 100 % naasthi stand (totally left wing view) is only a 1/6 possibility according to this. But, we find that in columns D and E, if we first say there is no Dwaraka at all, the third question, whether it was the city of a historical Krishna/whether there was a Krishna in Dwaraka (second question) does not exist at all. Therefore these two columns of naasthi Dwaraka does not exist/or stand nullified. Then only 4 possibilities are there and A and B have $\frac{1}{4}$ chances each for them (all or none answers). The other two possibilities are C and F, the first stating that there was a Dwaraka but no historical Krishna in charge of it, and the last stating that there was Dwaraka and a historical Krishna but that

Krishna was not in charge of Dwaraka as Vyasa and all the older generation historians point out in all our scriptures.

We know that India had several portcities in ancient times and India had traderoutes to all over the world from ancient times and both archeology and and scriptures of distant places give evidence of it. The scriptures of Babylonia and Assyria speaks of the port city of the Melluhas and the darkskinned people of the Meluhha. Krishna was a darkskinned man. Vyasa speaks of the city of Dwaraka and the way to it from Hasthinapura/ Indraprastha in 10th chapter. He mentions the places he crossed to reach his Dwarakapuri in order as follows. From *Hasthinapura-to kurupanchaladesa-soorasena-jaangaladesa-yaamunadesa-brahmaavartha-kurukshethra-matsyadesa-banks of saraswathy, the desert areas, soubheera, aabheera, aanartha, sindhud esa, dwarakaapuri*. When he reached Aanarthapuri he took out his conch and blew

so that people in his entire country from Aanartha to Dwaarakaa could hear it and rejoice in his homecoming. This clearly shows the Meluhha country of the Assyrian /Babylonians was the Krishna's famous ports in Sindhu and Brighukatcha coast of India. If historians can believe an Assyrian scripture which knows nothing about the Meluhha country except that it is sending precious export quality goods to them, and they are dark people and have a civilized urban living and knowledge of metallurgy and shipbuilding and a curious dialect and weight and measures, the accounts of the native Vyasa also can be taken as counter checks by the historians/archeologists. And all these landmarks are still there so that any historian can verify this account/route .

When Arjuna returns from Dwaraka , yudhishtira asks whether everyone in Aanartha is okay, showing that Aanartha was the extreme boundary of Krishnas territory on one side and in one of the Assyrian

scripts this name is actually mentioned. That means even after the submerging of Dwaraka , the people of AAnartha and of Sindhu/Mlechadesa were in constant trade relations to outside world. The urban civilization of India had started not with Krishna but with King Prithu according to vyaasa in bhaagavatha. The graama, nagara, rural/urban construction and houses, forts, sibiras to protect and defend were first made by Prithu who also started the system of obtaining dhaathudravya or minerals from earth and using them for happy life of all of his people. That is mettallurgy goes back to period of Prithu whose geneology is very ancient .

The art of mapmaking, using it for world wide travels and cultural/economic exchanges, keeping watch over the cosmos and the meteorological phenomena, studying spacetime, and universe , its origin , the study of archeoastronomy, and ethnoastronomy, and archeogeodesy are as old as the human

inhabitation in the subcontinent of India and we have archeological, paleoarcheological as well as scriptural and literary evidences for it from a very very ancient past.